

AVIATION WEEK

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APRIL 5, 1954

50 CENTS



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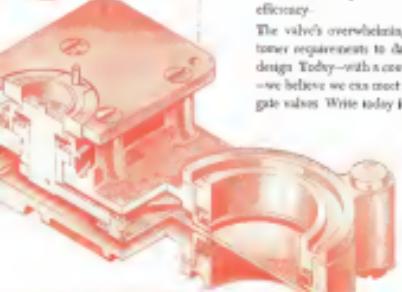
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RESEARCH KEEPS

B.F. Goodrich

FIRST IN RUBBER



How B. F. Goodrich saves flying businessmen time, worry, money

To make important business calls, executives of the Hoover Company fly all over the country in their DC-3. Like many other executive planes, it carries B. F. Goodrich equipment to prevent delays, add safety, cut costs. Here's what Mike Maday McMillen and Co-pilot Dave Adcox have to say about the BFG equipment:

B. F. GOODRICH ANTI-FREEZE FLUID FEED SHOES. "We never worry about propeller ice. The feed shoe is a great job. BFG propeller feed shoe is also economical in weight, space and maintenance."

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brackets get only five more landings per tire, but are lighter, make loadings quicker and safer."

All this conserving, with saving and cost saving B. F. Goodrich equipment is just a sample of the many developments in aircraft that have come from B. F. Goodrich rubber research and engineering. Other BFG aviation products include Inflated Tires, Pressure Sealing Zippers, Aviation, Inflatable seats, Fort Cells, Rovers, tires and other accessories. Write B. F. Goodrich Company, Divisional Sales, Akron, Ohio.

B. F. Goodrich
FIRST IN RUBBER

J-M Clipper Seals fly with the Sikorsky HOSS helicopter...



Clipper Seal being installed in the intermediate gear box of the Sikorsky HOSS helicopter to seal oil in, keep abrasives out.



Photograph and cross section of Type LFD Clipper Seal. This is just one of numerous styles available to solve tough sealing problems.

... seal oil in, keep abrasives out, at critical locations

To seal the lubricant used in its complex rotor and gear systems... and to protect bearings against the infiltration of abrasives... the new Sikorsky HOSS helicopter depends on these positive sealing qualities of Johns-Manville Clipper Seals.

Clipper Seals are flexible—molded of special compounds, they have a tough, dense heel and a soft flexible lip conveniently molded into one piece.

Clipper Seals reduce friction—A specially designed guitar spring holds the lip in tight but free contact with the shaft. Then a positive seal is always maintained but shaft wear is reduced and over-lubricating is prevented.

Clipper Seals are corrosion-resistant—The molded body is entirely non-metallic, in therefore unaffected by electrolysis and most forms of corrosion. And the guitar spring is available in various corrosion-resistant metals.

Clipper Seals are versatile—They can be furnished in flange sections of varying widths to fit practically any casting. Various lip designs are available... and various lip compounds provide the proper glands for temperatures from -55°F to +450°F.

To find out more about Clipper Seals and their application to your particular sealing problems, write Johns-Manville, Box 60, N.Y. 16, N.Y. In Canada, 199 Bay St., Toronto 1, Ontario.

Domestic

USAF's experimental Convair XF-91A and two Northrop X-4s have completed high-speed research work at Edwards AFB, Calif., and are being readied for use in static display. The XF-91A and one X-4 will be shipped to the Air Force Technical Museum at Wright-Patterson AFB, Dayton, the second X-4 will go to the Air University at Maxwell AFB, Ala.

Northrop Aircraft has received a \$1.5 million Air Force contract for production of additional F-51A all-metal interceptors, resulting in the plane builder's Hawthorne, Calif., factory. The new contract increases Northrop's backlog to a record 5557 aircraft, scheduling delivery of the redesigned Scorpion through August 1958.

Aerospace Airlines DC-7s broke the transcontinental speed record for commercial transports twice in less than 24 hr. last week, setting an official Los Angeles-New York record of 6 hr. 10 min. Mar. 29 and bettering that speed the following day with an official record of 5 hr. 31 min. The official record was set by National Aerospace Aviation's Frawley model 6 hr. 17 min. set in 1949 by an Eastern Air Lines Canadian flight.

An transportation ban was reduced from 15% to 10% last week when President Eisenhower signed the excise tax bill (Aerospace Week, Mar. 29, p. 12). The measure also extends the two-cent aviation gas tax, previously scheduled to be cut to one cent a half cent. Apr. 1.

Midwest Airlines has purchased a 51% interest in Fly-In, Inc., will begin operating the eight-passenger regional air service classified as second class. The maximum TWA fare difference in new routes principally was caused by an increase in depreciation charges of each \$5.5 million in new aircraft.

Chicago Nationalistic government of Venezuela will receive assistance from Civil Aviation Administration in establishing an airways system. A CAA team, just assigned to the Far East under the Foreign Operations Administration's program, will advise the Chinese on site selection, installation and testing of short VHF communications equipment and on training of personnel to operate traffic control and automated communication flying service equipment to be established.

United Air Lines has taken delivery on the first of 21 Douglas DC-7s on order, plans to begin operating the



B-47's New Takeoff Power

Testing clouds of smoke, a Boeing Stratocruiser fuselage loader takes off, using 11 extremely brief rocket bursts delivering 1,000 lb. of thrust each to supplement the power of its six General Electric J47 turbines. Power of Stratocruiser's J47s has been increased with use of water injection to improve aircraft performance. Rocket B-47s are fitted with 15 LORRI-B thrust rocket boosters under the fuselage. The new powerplant arrangement, fitted to B-47Gs, has presented an increase of 15,000 lb. in takeoff weight for a maximum gross weight of 280,000 lb. The rocket assist units are mounted on a "honeycomb" fitting and can be jettisoned after use instead of becoming dead weight in case the unit with other internal use. The compressor case formerly given over to internal rocket assistance now can be used to carry additional equipment.

Wright Turbo Compound-powered transports from 4 to 14 passengers transcontinental flights. Cost of GME's DC-7 fleet: \$55 million.

D. Walker Swain, assistant to the president of United Air Lines, has taken a leave of absence from UAL to accept an appointment as Deputy Assistant Secretary for Public Affairs in the Defense Department.

Air Traffic Direct has been purchased by American Aviation Publications, was incorporated into the Washington, D. C., company's Traffic News Corp. It

Financial

Tufts World Airlines reports a net income for 1957 of \$5,064,702, a decline of \$2,596,194 from 1956. Dividends were cut to 50¢ a share from \$1.00, and earnings per share declined from \$1.05 to \$0.55.

TWA's very difficult year in new aircraft principally was caused by an increase in depreciation charges of each \$5.5 million in new aircraft.

Continental Air Lines' net income for 1957, boosted by the sale of four Convair 340s, increased 91% to \$1,129,771. Total operating revenues were \$11,079,809, compared with \$8,591,362 for 1956.

Republic Aviation Corp., Farmingdale, N. Y., reports a net income for 1957 of \$3,314,341 from sales totaling \$411,018,885, compared with 1956's \$8,056,001 net and \$402,235,005 in sales. Bidding B-57 more than \$1 billion has been let to quantity by the British Army.

India's nationalized air transport system has ordered 10 Lockheed Super Constellations and two de Havilland Comet 3s. First two Super Constellations are expected by June.



Johns-Manville

PRODUCTS for the
AVIATION INDUSTRY

Critics Urge More Money for Airpower

- Democrats charge proposed budget cramps Air Force, puts economy first and defense needs second.
- Symington questions possibility of reaching 137-wing goal with \$11.2 billion requested by Administration.

By Katherine Johnson

A vigorous drive to ensure Air Force funds for the \$11.2 billion proposed in the Administration's fiscal 1965 budget is developing. Sen. John F. Symington, who leads the Administration's opposition to the budget on the argument that the administration puts about emphasis on an airpower power.

The Democrat's budget statement, defining the "new look" as the "full exploitation of modern air power," and Secretary of State John Foster Dulles' insistence that it relies "primarily" on airpower, affords power not off a surge of Democratic criticism against reducing the size of the force.

But recent statements by President Johnson and the chairman of the Joint Chiefs of Staff, Gen. Arthur Radford, have spurred Air Force advocates to denounce the Administration's program for 137 USAF wings by 1975 as "a little too late."

Debate Showdown. Democrats are attacking the defense budget on the grounds that it puts economy first and defense second and fails to provide adequately for either airpower or ground forces.

The first major public attack on the budget took place when the budget is scheduled for debate on the House floor. The House Appropriations Committee is scheduled to report it out April 25.

Chief critics of the defense budget include:

- Former USAF Secretary Sen. Stuart Symington, who criticizes Defense Secretary Robert Lovett's estimate of \$16 billion annually required to maintain a 143-wing USAF.

Symington says "Even assuming that a reduction from 143 to 137 wings cuts by some fraction of the \$16 billion figure, the gap between that budget and the \$11.2 billion figure in the budget requires some change before we're in for too great a financial hit."

Rep. George Mahon making Densa on the House Military Appropriations subcommittee who published an

analysis of the Administration's plan to cut back the level of USAF research and development effort from \$552 million this year to \$451 million in fiscal 1965.

Rep. Samual Yost, who declines to say whether he agrees with Symington, says "We don't believe that while maintaining a strong defense, they are cutting Air Force funds for research and development from \$5.5 billion this year to \$3.7 billion for fiscal 1967."

Primo advocates by Sen. Leventhal Salakoski, chairman of the Senate Armed Services Committee, on the adequacy of the controversial defense program were challenged by Symington, a member of the committee.

Salakoski and after a committee hearing by Robert Sprague, Minnesota senator, who was re-appointed to make an air defense survey, that the update program was underway enough to constitute a major overhauling of defense forces.

"The resources now underway and planned for the future should, together with our offensive forces, provide an effective defense for the U.S. command units with the threat."

Symington says he does not consider the "the statements justified by the facts and opinions presented at the hearing."

Figures in *Focus-Demands* for a new look at the "new look" was issued by Symington and the chairman of the Senate Committee, recently elected chairman of the Senate Appropriations Committee, which handles the defense budget.

"There is much opportunity to consider figures, less opportunity to consider facts."

Symington also recommended cancellation of establishment of an inventory committee, such as the 1947 *President's Air Power Commission* headed by Thomas Finletter and a congressional committee similar to the 1947 *Admiral Ernest J. King* Board headed by Senator Strom Thurmond.

"I understand there has been

failure to set up an overall air power policy in the Administration through the current Air Coordinating Committee," he says.

For membership on the committee, he suggests Finletter, John McNamee, vice chairman of the *Finletter Commission*; Robert Sprague, president of Sprague Electric Co.; Roger Ross, deputy Defense Secretary; Major Gen. Bernard Barak, who has backed a strong mobilization program; and Robert Lovett, former Secretary of Defense.

Rep. Carl Hershner, second-ranking Republican on House Committee on Armed Services and vice chairman of the old Aviation Policy Board, supports establishment of such a board to coordinate the status of airpower. Hershner will not support a plan in view of the administration of *Cooperation* in a few months and the bill elements.

"It would take us months to get legislation authorizing the board as set up," Hershner says. "There isn't time this year but I think we should set up such a board next year."

Obligating Kyle. Symington urges the Administration for failing in obliging USAF aircraft procurement funds and stretching out the procurement of a 137 wings from 1965 to 1968. With \$6 billion available for new aircraft procurement between fall of 1964 and this fall, he says, "we have a backlog of one billion for which the Department of Defense has been Obligated."

To have the Department of Defense talk about it," he says, "we would think a contractor was a very good thing. They refer to carriers as though there were more that has been 'told' and themselves 'told' is the 'book.' But what is it commendable about a defense agency not doing what we say the Congress were previously told by the same agency must be done, in a more or less time period for the security of our nation?"

The single answer to the above would have everyone in the two year procurement of airpower backlog from 1965 to 1967 that has taken place under the so-called "new look."

By this pattern off the target date for two years, it had been possible to stretch out the process of obtaining the procurement funds requested by Congress in 1962 over a three year period 1963 through 1965 instead of the one year 1963 contemplated by Congress at the time of the appropriations.

"I understand there has been failure to set up an overall air power policy in the Administration through the current Air Coordinating Committee," he says.

Break in strength, particularly in long range bombers.

According to USAF Chief of Staff Gen. Nathan Twining, most of the Soviet air force "is now more than half reequipped." Symington insists that "under the Administration's new defense program, not even an air arm, Air Force, Navy, and Marine—will not be 50 percent older than 1957, three years from now."

Yost, Democratic candidate for the Senate from California that year, says "Secretary Wilson has you gathered the own intelligence report and said that the Soviets could be more aircraft if they didn't have a performance limit. I think the Soviets will be prepared to defend themselves. A few weeks ago *AVIATION WEEK* carried pictures of Soviet long range bombers, which were reported to have the best range."

Yost claims the Administration looks at the country's capability "through the wrong end of a telescope" and then looks at U.S. capabilities "with a pair of binoculars" so that they are double."

PAL Quits Long-Range International Routes

Philippines Air Lines has dropped all of its long-range international routes, including flights to San Francisco and Honolulu, in association with a new government air service policy aimed at improvement of domestic services. (*AVIATION WEEK* Mar. 1, p. 40)

The carrier will continue operations to Hong Kong, Bangkok and Taipei and plans expansion of regional services in Southeast Asia.

All DC-10 and DC-8 equipment will be sold, along with planes Convair 990s will be kept for domestic and regional service. PAL plans expansion of long-haul routes with both Convair 990 and DC-3 aircraft. Domestic airports will be improved.

The carrier will continue maintenance of USAF aircraft under contract and will seek to develop maintenance contracts with commercial carriers using the Philippines.

PAL officials indicate that they will continue to study the potential of the helicopter closely with a view to creating short-haul service in the Philippines.

PAL has been operating international routes since 1946.

Jet Teams to Compete

USA's first jet-jet-gear-and-wing race meet will be held June 7-13 at Naha AB, Okinawa. Nine teams from seven major Air Force commands will compete, flying F-106s, F-104s, F-105s and *McDonnell* F-94s.

Policy Resists Outlook:

Fewer Federal Dollars for Air Aid

Air Coordinating Committee will ask strict control of airline subsidies and aircraft progress payments.

By G. J. McAllister

Air Coordinating Committee will recommend stronger economy in federal financial aid to aviation in its national policy review for President Johnson, observers forecast for next week.

The review, involving about 90 subgroups, probably will be submitted to the President in mid-May.

Subjects of most interest to the air transport industry:

- Domestic and International Subsidies.** ACC will urge a policies to determine the amount of federal aid in relationship to the industry's present stage of development and the overall fiscal policies of the Administration. Any changes in present subsidy policy would require legislative action since the existing policy is, in effect, a contract between the government and the industry.

Role of Federal Government in Development of New Transport Aircraft. Finance Department is that ACC will recommend against federal aid in the buying of new transport aircraft.

Role of U.S. Airports and International Air Transportation Services. Review will emphasize the continued development of air routes without compromising U.S. foreign policy and the need for the switch in emphasis in air travel to the benefit of international carriers.

Clear-Cut Policy. Part of major interest to the switch in emphasis in air travel will be the formation of a clear-cut



Japs Test New Lightplanes

Evidence that the Japanese are soon entering in design and construction of domestic planes is given in these photos of the new Kawasaki KAL-1 (top) and the Teijo T-110, both of which are now undergoing flight tests. The all-metal KAL-1 seats four persons and is powered by a 269-hp Lycoming engine. Landing gear is retractable. Top speed is approximately 175 mph. The first two seats are all-metal seats in flight test, the two-place KAL-1 with single landing gear. Few details of the Teijo T-110 have been released. Photo is a two-seat train with fixed landing gear and is powered by a 175-hp Lycoming fitted with a Frise airbrake system.

policy with regard to progress payments.

Progress payments in the past have been used for tasks purposes in financing major military construction, and will state that no payments will be determined on the basis of contractor's financing requirements.

ACC also will develop a policy on a common navigation system, working closely with the Air Navigation Equipment Board. This is a technical aspect that will be separate from the overall policy review.

► **Review Expanded**—The committee has expanded its study to include an analysis of U.S. policies toward the aircraft manufacturing industry.

However, ACC will focus recommendations in the field where both cost and delivery of aircraft development, production and sales will affect. Fully defense aspects will be transferred to the Department of Defense.

► **Aviation Study**—Navy Secy. Stuart Symington recently signed establishment of an air policy commission and a joint congressional aviation policy board. Two such bodies were formed in 1947. See Symington stated: "I have always believed that if the recommendations of the two commissions had been followed, we would not have had the Korean war."

Symington pointed out that one of the reasons for forming the two commissions would be to develop an air power policy. ACC's review does not extend into military aerospace requirements.

In an internal report on May 15 to Sherman Adams, Assistant to the President, ACC Chairman Munro stated: "By about Apr. 1, the committee expects to have on hand 10 or more separate preliminary papers which then will be combined. These have been prepared by some 40 separate subcommittees or subgroups of the committee in accordance with ACC procedure. These were prepared after analysis of recommendations from independent agencies of the military and the public."

► **Working Groups**—In view of the ACC's development of the review work in this manner, a working group from each interested federal agency is appointed to deal with a specific subject. It prepares a policy paper draft which is considered by federal agency responsible to deal with a specific subject.

The group draws up a paper, paper draft and turns it over to federal agency members at the next highest echelon above the working group. The paper then is forwarded for consideration by a special house group which is composed of top ranks in the ministries of the committee.

► **Logistics Group**—Members of the special house group are Fred B. Lee, Civil Aviation Administrator, chairman; Emory T. Nessauer, general counsel;

Knots Win

Knots and nautical miles will replace the aeronautical system throughout the air transport industry by Oct. 1.

Civil Aeronautics Board has voted to use time which began in April 1958 and ended last summer as a reference. Although the military operates an aeronautical system, various civilian groups have lobbied the switch-over on aeronautical surface service.

Private pilots have the option of using either statute or nautical miles under the Board's order.

Speed and distance measurement normally will be maintained in statute units in ground-to-air communications, but speed specific requests will be transmitted in statute units, CAB said.

Changes will not be required in some currently required with visibility, such as chart, radio flight chart, aeronautical information publications and manual enroute aircraft instruments.

Secretary of the Navy for Air Earl B. Wadsworth, director, Bureau of Air Service, Test Office Director, Capt. Paul Berenger, director, Office of Transport and Communications Policy, Department of State, Capt. A. J. Hevelin, Director, Division 8, U. S. Coast Guard, Treasury Department.

Following approval by the Senate group, the report is given to Col. Miles French, a special committee, who prepares the policy recommendations for submission to aviation industry groups, such as Aircraft Industries Assn. and Air Transport Assn. Industry recommendations will be presented to the Board in which to comment on the policy papers. The papers, with industry comments, will be considered at sessions of ACC.

► **Implementation**—After approval by the full committee, the report is handed to the President.

Munro noted: "The president is encouraged, but it is necessary for him to make an independent judgment and executive decision as to many fields of United States and international air policy."

"While this process of inter-departmental aviation policy is on, it will produce for the President's consideration a report that can be study for immediate implementation, if cause, where legislation is unnecessary."

The "immediate implementation" is a major point in the review. Along with each recommendation, ACC will suggest a specific agency responsibility for carrying its accomplishment.

Presidential approval of recommendations and recommendations will be the subject of an executive order. This is the principal difference between the ACC review and the Executive Committee report of 1948, which proposed more mandates and did not specifically assign agency responsibility.

► **US\$600** Cost—ACC plans to file a confidential supplementary report outlining status of imports not definitely actuated at the time of the reference of the review. An example of this is the problem of mail rates between Post Office Department and CAB.

Cost of the review is approximately \$15,000, which will be taken by two full-time special consultants and one part-time consultant.

Full-time consultants are Col. Miles French, a Washington aviation consultant who will join the Post report, and Roger Munro, vice president and economist of Buddle Test Co., New York, who is handling the manufacturing aspects of the review. Part-time consultant is Charles Clark, former executive secretary of ACC and now an official with Curtiss Wright Corp. Clark is concentrating on aircraft export policies and will look into present export financing regulations of the Export Import Bank.



LeMay Flies YB-52

Strategic Air Command Gen. Curtis LeMay (second from left) stands with the YB-52 Stratofortress eight-jet heavy bomber he piloted during a recent trip to Bunting's, Wash., plant. At far right is William E. Bush, Boeing senior vice president. Also shown are the Boeing crew members who were in the LeMay plane left to right: Richard Louch, Lt. Col. Guy M. Tousignant and Capt. John Eberle.

Air-Rail Fight

- Airlines ask fair chance to win federal business.
- ATA and monskeids join to battle underwriting.

Three competing airline associations—Air Transport Assn., Air Coach Transport Assn. and Independent Military Air Transport Assn.—have joined forces on an effort to end underwriting by railroads for military and other government business.

Here is the crux of the matter:

► **The 1949 Interstate Commerce Act** grants railroads to transport government personnel from A to B at reduced rates. The programs, carried over from the 1940-50 period, when the government encouraged transportation and travel through land routes, provides for special rail rates to the government as a means of support.

► Both scheduled and consolidated air carriers have been held in quoting low fare for government business. The 1950 Civil Aviation Act provides that all airline fares are subject to Civil Aeronautics Board approval and will be published in advance.

► **Air Traffic Losses**—The result of this situation is that railroads are free to make deals with the Defense Department for military personnel transportation at lower amounts than other carriers.

There is no argument that railroads have been published and made known in airline competition, or as approved by ICC. Airlines, however, cannot bid below rail rates fixed and approved by CAB.

From a natural point of view, DMATA and ACTA are most deeply concerned, because military traffic represents a major portion of their income. These independent carriers report drops of 20% to 30% in military business due largely to the availability of railroads. They argue such bids lead to losses. They were competing for rail and air travel and travel costs for non-competitive military business.

► **Profit Principle**—ATA is concerned not only about the loss of defense business, which represents a comparatively small part of scheduled airline income, to the rail but also on the policy principle involved. If that principle is followed to its logical extreme, it

► **The 1958 CAA Act** would be intended to prevent airlines and railroads to bid for fare and reduced rate travel to the government.

► This would mean all not yet using the services, consolidated and unconsolidated, bid for Post Office and contract air mail in military business.

Atomic Engine

Atomic Energy Commission plans to spend a \$14.2-million program for continuing development of two aircraft propulsion reactors in fiscal 1959.

Of the total, \$8.6 million is earmarked for a contract with Pratt & Whitney Aircraft and \$3.6 million for a contract with General Electric Co. Each company will take a different approach.

Underwriting is to be below fiscal 1958 level of \$15.5 million and the 1955 level of \$17.5 million.

► **NA Contract**—ACTA also plans a \$2.5-million contract with North American Aviation next year for continuing development of a supercharged reactor, one of the power-generating reactor projects sponsored by the commission. The project involves development, construction, and test operation of a reactor designed to produce 30,000 kilowatts of heat.

North American has agreed to contribute \$2.7 million of the total, \$800,000 out of the program, intended to be completed in 1959.

In meeting the rail's strategy to capture defense business, the three airline associations are using three divergent approaches.

► **DMATA** is asking cancellation of the station at ICC.

The association has filed a case, naming 112 railroads as defendants and charging they are



UAL Receives Its First DC-7

Kiwi Air Lines' flight crew examine the first of 25 Douglas DC-7s ordered by the carrier shortly after it left the manufacturer's Santa Monica, Calif., plant Mar. 29. UAL plans to inaugurate nonstop transoceanic

flights in "cruise, refueling, stopover and discontinuous roundtrip" that is not in agreement with the policy of the 1949 Transportation Act for nondisruptive development of transoceanic water transportation. A decision of April 11 has been set for the 14th of October to the railroads, to which the case will be set for hearing.

► **ACTA** is seeking to obtain action by Defense Department and has presented a brief pointing to the act, sweepingly through the writing of railroads' paragraph, through the use of air, rather than rail transportation.

ACTA did not pin on the DMATA suit with ICC because the association felt this proceeding would be lengthy and, in the meantime, Defense Department would continue granting low bid contracts to the rail pending outcome of the case.

DMATA, on the other hand, said statements from key defense officials said that the department had no alternative but to accept low bids convinced the association there would be no action from Defense Department and that it should file recourse to ICC.

► **ATA** pamphlet is introduced in legislation introduced by Rep. Carl Hibben, that would cancel out the ICC Act provision giving the rail a free hand to bid low on government business. In addition, the legislation would require the defense budget to also provide for a second contract against Post Office Department contracting with unconsolidated airlines for mail business at rates below the scheduled rates. Postmaster General Arthur Sauerbrunn is seeking this authority.



CONVAIR C-131A SAMARITAN aerial medical transport is produced by the San Diego Division for Military Air Transport Service.



ELECTRIC LIFT can hold two litter or 500 lb. of cargo smoothly through wide door.



SEAT/LETTER COMBINATION inside C-131A. Quickly detachable seat for medical

Mercy Plane

- Convair delivers first of 26 C-131As to MATS.
- Each Samaritan carries up to 27 litter cases.

Military Air Transport Service has added another step to its disease-susceptible evacuation fleet with the recent delivery of the first of 26 Convair C-131A Samaritans.

The C-131A is a version of Convair's commercial 240 transport. It is a 235 mph airplane capable of handling various configurations of up to 37 seats or 27 litter and seven seats. Seats face forward.

► Convair's Thorne-Heath Samaritan can carry two light seats and two central stretchers and a crew of three. Chair version of the aircraft is to allow patients from points of entry to hospitals of destination throughout the U.S.

On the delivery flight, the first C-131A, from Convair in San Diego, Calif., where it is being built, to Washington on 3 May 10 mm. The 3,530 lb. flight averaged 199 mph without re-fuel. Payload was 16,000 lb. or the equivalent of 25 litter patients.

The C-131A is the first pressurized transport aircraft to be used in transport as used by MATS. Its commercial cousin, the Convair 240, already has logged approximately 16 billion passenger-miles throughout the world.

► Loading Apparatus—Great weight of the C-131A is 43,375 lb. It is powered by two Pratt & Whitney T38-39 engines. Service ceiling is twice that 26,000 ft. It can take off in less than 3,000 ft.

Feature of the airplane is its large, hydraulically operated door, kinged at the top and installed on the left side

of the fuselage aft of the wing for loading litter patients. A standard Convair-Lockheed stretcher, folding into the airplane, is located on the right side forward of the wing.

There is provision for carrying two large stretchers and oxygen equipment. A men's table is equipped with medical supplies and food.

► Mobility Rate—Lowland—MATS officials pointed out during delivery ceremonies at Washington's National Airport last week that during the Korean conflict more than 95% of combat casualties were admitted to the U.S. for specialized treatment. The mortality rate of Americans wounded was less than one-half that of World War II.

Only two out of every 100 injured fighting men in Korea died as a result of their injuries in World War II, the war in Korea was eight and one-half times as deadly. MATS plans through basic research, 67,000 patients treated by the First during the Korean campaign. Since MATS was formed in Jan. 1949, its planes have logged more than 750 million patient-miles.

B-26s Give French Edge in Indo-China

U.S. aircraft furnished to the French under the Mutual Defense Assistance Pact, are playing a dominant role in the combat battle for Indo-China.

That is evidenced by the recent trip to Washington by Gen. Fred Eby, French chief of staff, to request additional aid, particularly aircraft. Following his visit, Defense Department announced that 25 additional B-26 light bombers would be furnished to the French.

► Major factors—Airpower has been the major factor in keeping strategic Da Nang-Baia in French hands. More than two French divisions there are now encircled by Red Vietnamese forces and are at low ebb. The siege of Dienbienphu has been lifted after two weeks of efforts to encircle and completely besiege Dienbienphu superfully.

One fact in permanent U.S. will be with whatever equipment is needed, especially aircraft, to keep Indo-China from falling to Red forces.

President Eisenhower described the Southeast Asia area as one of "the greatest importance." Secretary of State John Foster Dulles, in a major policy speech last week, and "Southeast Asia is the second 'Rocky Bowl' which helps to lead the densely populated region two-thirds from India to Japan. It is rich in mineral raw materials, each in its oil, rubber and iron ore. It offers natural Japanese potentially important markets and sources of raw materials."

U.S. determination to furnish aid necessary to keep Indo-China in the Western orbit is clearly evident. Dulles says: "Under the conditions today, the importance of Southeast Asia of the political system of Communist Russia is clear. Communism may, in whatever form, be a great threat to the whole free community. The United States feels that that possibility should not be properly accepted, but should not be ruled out either. This might involve serious risks. But these risks are far less than those that we will face in a few years from now if we do not act today."

► Worked Out—Under the Mutual Defense Assistance Pact was negotiated recently.

Gen. D. P. Weyland, Far East Air Forces commander, stated Indo-China has mostly been handled on the initiative by the military assistance advisory group and the military aid by the State.

Far eastern forces 12 B-26 light bombers to the French forces there, and to furnish 190 mechanics and tactics can plus the necessary supplies and administrative personnel. Later, 10 B-52s were furnished. The mechanics and supplies come from FEAF units, and are based at two air bases in central areas.

"In both cases," Gen. Weyland said, "they are for the specific purpose of giving training and assistance to French air force personnel in the maintenance of B-26 and C-47 aircraft, and not in their entirety to find out whether or not they should be retained in France."

► Transient Support—Dulles' visit is necessary to give logistic support to a Far East Forces personnel in Indo-China, Weyland stated. As a result, the 13th Air Division has assumed its regular combat service to reinforce Indo-China.

The evacuation of the source, seven consists of two Sloviansk (C-47) flights daily from Clark AB in the Philippines to Indo-China.

In the negotiations of the MAAAG an Indo-China C-47, AFM has been designated the primary transport for strategic functions.

► MIAAG—After the Indo-China conflict had been sent to Indo-China prior to the disengagement of the first 12 B-26s. However, C-130s and C-47s are being used in the supply of French divisions transversed at Dienbienphu in Cam Ranh against ground forces.

USAF Takes Action On Airline Fuel Bills

Air Force is taking quick action in collections of fuel taxes to airlines, as required by a Senate Armed Services Subcommittee change that USAF is not fully aware which carries over AF contract and how much. Disbursement bills

have been kept "in escrow" and gear unrestricted.

"We made an effort to find out what happened to an account when they became delinquent in payment," Sen. Ralph Flanders, chairman of the subcommittee declared, "and we found out. Nothing happened to them. Although they had not paid for gasoline on account, the Air Force permitted them to continue to purchase gasoline and other materials on credit."

Herrings declined.

► USAF estimates its know delinquent accounts for fuel purchases in arrears at \$584,000.

► There is doubt that USAF will be able to exertion payments due for purchases prior to July 1, 1953.

► Airlines operating under transport contracts with the Air Force are permitted to pursue nonstop flights at any of USAF's air bases throughout the world.

► Arctic Hierarchy—H. Lee White, Air Force Secretary of the Air Force for Materiel, recently gave a directive to stand to the head of the Air Materiel Command that, "if we can't find you morale there is no other place in the chain on which to get funds to sustain that may be needed."

"I am also going to have a check of the contractors who were under contract during the period before July 1, and we may have to rely to some extent on their honesty to find out whether or not they still exist, or are still in business," White said.

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The task now White says is reapplying as the procedure for making collections.

► An airman account is delinquent, USAF sends MAAAG over the air a 15-day notice. If payment is not made in the 30 days a more stringent action demanding payment at 15 days is made. Then the account is forwarded to Air Materiel Command, from there to the USAF Finance Center at Dulles, and finally to the General Accounting Office and the Department of Justice in Washington, D. C.

Light Fighter Stirs Design Controversy

- U. S. and British views on lightness differ.
- But so do our ideas on aircraft's mission.

By David A. Anderson

One of the hottest airplane design controversies of recent years has been around one simple question:

What do we mean by lightness? To Americans designers equate it to savings for fighters which try to scale at the 30,000-lb mark, arriving under 15,000-lb in flight.

To AFM Lt. Gen. James Nasrat, MATO as deputy, a lightweight fighter should weigh in at about 5,000 lb empty. That is the specification figure he has approved for a new ground-support plane to bolster NAFOF inventory.

The newest contemporary approach is Lockheed's F-104, based on the USAF's look at a day-superiority fighter. Among other firms, Grumman has announced that they have a lightweight fighter in the works, and North American and Northrop are reported to have projects under way.

The basic idea is simple: Build the minimum fighter that can outfly as well as outfight anything the enemy can put in the air.

► **Fair Speaks**—The real drama started a year ago, with a group of informal MiG-Alleyers busking the light fighter down through the long corridors of the Pentagon.

Star of the nucleus equipment, they demanded, and gave up on a fighter that can outfly the MiG.

Take all that extra weight out of the Sabre, they said, and we'll tackle the MiG at 50,000 feet.

The Pentagon view was that maybe those pilots couldn't see the forest for the trees. They were intensely concerned with their war zone the Yaks, and perhaps forgetting that they might not always be fighting under Korean ground rules.

Then the ingenious Sabre came along—with more thrust and a 6-3 weight-as-part-of-the-tension. The war ended a while later, but the heat between saboteurs at about eight-to-one in favor of the USAF.

So the light fighter controversy was never dead.

► **Rebuked in Europe**—Today the argument has popped up again, but in

Questionnaire on Day-Superiority Fighter

That is the questionnaire AVIATION WEEK sent to leading U.S. aircraft firms, to determine thinking of engineers on the requirements for a day-superiority fighter. The results of engineers or teams favoring each approach is given after the individual items.

Answers that would be a day-superior fighter. There are three sections on aircraft weight, mission and performance. Total weight in pounds should be equal to maximum at 40,000 to 50,000 lb. Vertical climb after takeoff is desirable. Endurance is not listed. The fighter should be equally effective against enemy fighters and bombers. Quantity production is assumed.

With these crude requirements at a glance please check the proper items.

Emptyplane gross weight would be:

Under 10,000 lb 0 Surface-mounted weapons 0

10-14,000 lb 0 Other 1

Over 15,000 lb 10

Ground assembly load would be:

Straight wing, with tail 2 Machine gun 8

Swept wing, with tail 10 Cannon 9

Swept wing, tailless 10 Upgraded rockets 30

Delta, with tail 7 Guided ordnance 9

Delta, tailless 6

Powersplant would be:

Turbojet plus afterburner 11 Ejection seat 18

React. plus afterburner 10 Radar intercept 7

React. plus afterburner, retractable 10 Radar 14

Turbojet, afterburner, retractable 10 Self-testing mechanisms 22

Upgraded systems of any kind 9

Powersplant, unique 2

General construction would be:

Designed for heavy loadings and maximum (factory prep) 8

Conventional aircraft practice 12

Fence installation would be:

Based on 12

Padded 3

Emptyplane gross weight would be:

Under 10,000 lb 0 Surface-mounted weapons 0

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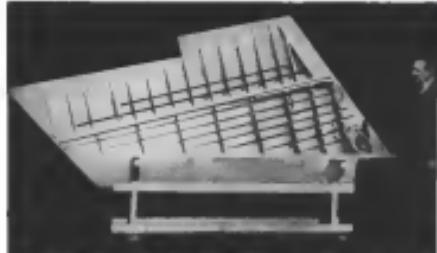
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PROTOTYPE Gnat wing shows skin and stiffener construction absorbed in wing root to produce the integral structure now being designed into new aircraft.

from conventional skins, there were no skin stiffener approaches. About the time any of the various denoted firms expected changes in the financing of a man had as a weapon by an engineer, and the choosing of a combined powerplant of turboprop plus sustainer by two designers.

► **Peter's Gnat:** On the other side of the Atlantic, work is progressing rapidly on the Pfeiffer Gnat, an ultra light type of fighter, first offered as an interceptor and now being tested for ground-support duties.

Designed by W. E. W. Pfeiffer, who had won the Caribbean for English Electric, the Gnat is a wing canard and tail fighter. Specifications have up to present in this magazine (Aviation Week May 1, p. 23) in the most recent edition.

Pfeiffer's design data and ideas were stated in great detail in a lecture he gave before the Franklin Association of Aerospace Engineers and Technicians last June. That lecture stands as a high-water mark in presentation of the techniques that make light and fast fighters.

Pfeiffer concludes that a third amount of money buys four or five times as many light fighters in it does heavy ones.

He basic argument assumed two fighters to be compared. The small fighter weighs 3,500 lb and the cost "competitor" design weighs about 16,300 lb.

Both are assumed to carry a military load of about 1,100 lb. The weights apply to the basic airplane without afterburner or taking into account auxiliary fuel.

► **Production Cost:** Pfeiffer assumed that about \$17 million was to be committed for production of either type, and solved for the number of each that could be built for that fixed amount.



FUSELAGE WINGHEAD for Pfeiffer Gnat is built up from pressed sheet parts. No forgings or castings are used in the airframe.



FORGED JACKETING for Gnat wing stiffener/wingbone connection, leading gear at attachment point and rear attachment point to single plate, as contrast to the seven fittings usually required for these jobs.

Equivalence with quantity production of aircraft parts is the key to savings of money and delivery cost of the two types. Pfeiffer concludes that the single-seat fighter competitor fighter is three times the weight of the light fighter, the mere movement of man-hour will produce five times as many part places in terms of total cost, the ratio is some what better this four to one.

For \$17 million, Pfeiffer says that 900 small fighters could be built, the same money would only buy 215 larger planes. That means to be the case of the "light fighter" controversy.

► **Structural Design:** Pfeiffer claims that structural weight of the light fighter would be about 30% of the gross weight instead of the more common ratio of 50%.

One way to achieve this low figure is to absorb the weight in skin and stiffener construction, cheaper and easier to produce than the integral types of structures that is now being advocated.

Another way suggested by Pfeiffer was to combine what is usually a group of subassemblies into a single part. The man shown to illustrate this phenomenon is a current design which joins the wing/fuselage connection, carries the landing gear and provides the rear gear attachment.

A typical fuselage bulkhead designed with lightness in mind would be made largely of paired sheet parts, instead of having assemblies with forgings and castings.

► **Equipment:** Swings-Pfeiffer also argues convincingly that the systems of aircraft can be designed considerably simpler. He uses examples of hydraulics, fuel and pressurization systems.

The engine unit was selected by the critical Pfeiffer eye, and weight was reduced by three approaches: "good engineering design", using a maneuverable engine, velocity suitable for fighters, rather than a general purpose high velocity necessary for larger airplanes; and finally the elimination of what Pfeiffer called "froth", such as the provision for ground adjustment for changing the height of the nose instead of using the gear system for raising the level of the seat in flight.

► **Swinging Up:** These are two schools of thought on the approach to a light fighter design. The reason they are different is the recognition that British and American fighter designs have of late been different.

Our philosophy here has to design a long range airplane, this leads to quantization of pilot comfort, and the pilot gets fatigued.

The British have always stuck to short range. A pilot gets less exercise (fatigue) in 15 minutes than he does in an hour, and in combat comfort can be a little more spry in the British design.

But that doesn't explain all the differences.

Designers in this country have had to consider a precise approach, ready to fly and fight, and in the same conditions. U. S. airplane design has been required to concentrate on one day and break a flight the next day.

Yet as they say, designers cannot make an all-purpose package such as little as a single-day airplane.

That means to be the case of the "light fighter" controversy.

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2. Speed of stroke
3. Spread between jacks
4. Operating load
5. Mounting dimensions



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for traffic largely comprised of business, coach travel is largely personal, with a very high percentage of pleasure.

Wearers comprise only 20% of American's standard fare customers, but make up 40% of coach customers. The carrier says that these new customer patterns are "the result of a new customer base, a younger group than standard fare passengers, the company having family incomes of less than \$7,000."

Coach wearers are younger and as share many more married, clerical and service industry workers—a large number among them but flight, American reports.

While coach traffic has had an inhibitory effect in stimulating traffic, it is not without its plus, Hogan explains. "Because it is comprised of a large percentage of pleasure traffic, it peaks greatly in the summer months, making it difficult to sustain a satisfactory load factor on flights."

Since it is largely personal travel, it will likely receive more with change in general business activity, says Hogan. ▀ **Optimistic Outlook**—President Smith is quite optimistic concerning growth of American and the airline industry on the whole over the next decade.

This optimism is based on continued increases in population, a more accelerated younger generation coming into the travel market, continued diversification of U.S. industry, shifts in population and shorter working hours preventing more leisure time. All of these, says Smith, should stimulate the travel market.

▀ **Holiday**—Odeon's vacation profits reflect "carrying its losses in mind" financially. This has been the chief factor in the carrier's extensive expansion program and is the main reason the company was ready and able to finance DC-9s when the transports went into production.

"We made provisions in case DC-7 delivery integrated with that of one of our competitors," says Hogan, "but they were not immediately financially able to accept them. That's why we got the competitive jump on everyone."

▀ **Future**—Midnight-Flight equipment owned by American at the end of the year had an original cost value of about \$13 million. By the middle of 1954, which means that it will be \$15 million—an increase of about \$1.5 million in one year.

At the beginning of this period, depreciation charges were small, less than \$2 million in 1949. This presented AA with a financial task of financing.

Starting with a net worth of \$16 million, the airline around \$50 million from the sale of debentures and preferred stock. Depreciation rates began to increase rapidly, and today the company stock holds a much different position.

Plans call for the present equipment program to be completed within a few months. Hogan says provisions for depreciation will be at an annual rate in excess of \$20 million. He estimates that "with continuance of reasonable earnings," AA will be able to keep itself in a position to handle any equipment program that might develop.

▀ **Jet Expeditions**—If jet transport use increases within the next few years, American feels that first orders will not be for fleet replacement but merely will add planes to the conventional stable. The regional jet program may not represent a major market until sometime between 1955 and 1958, which totals about \$70 million, says the company.

Officials indicate they are keeping close watch on Boeing's 707 jet transport, with including those paying frequent visits to the plane-builder's Seattle plant.

Release widespread introduction of



New Allison Jet Gets Aerial Workout

Allison's flying testbed for its new J71 jet engine recently became the second at 8600-foot AFB, Calif., where the engine is being tested prior to use in the Douglas D-558 booster and McDonnell F1H Thomas

Splitter. This flight tested a modified North American F-86. Tomcat fighter bombers carrying the J71 under its belly. The J71 is removable into the plane's fuselage. The powerplant has 9,000 lb-thrust.



"O. K. To Jettison!"

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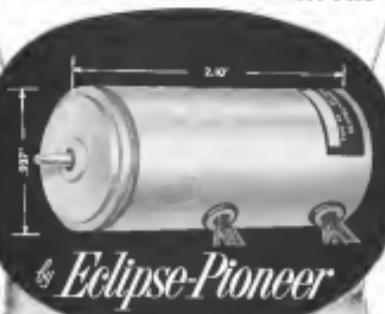
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jets on America's roads, however, only problems must be solved. Big question in the minds of ANA's management: "Can we operate a jet corrosion-free within the present fire structure?"

Other weighty problems from the airline's point of view:

- **Space.** More room than jet transports will require, especially during open tours from some metropolitan airports.
- **Traffic control.** to handle steady traffic. Also, says Hogan, "Will the airlines be able to afford the cost?"

He points out first, a \$4-million expenditure for jet aircraft would require an additional \$1.5 million for spare parts. "Quite a chunk of money," he observes.

► **Capital.** Finance—American's net worth has increased from \$57 million at the end of 1948 to \$92.6 million in September of last year. Earned surplus went from \$4.6 million to \$10.6 million during the same period.

Long-term debts, about 40% of invested capital, today stand at about 24%. During each of the last five years, ANA has converted more than 5% of its receivable debt plus tax. The average has been 6.8%.

American currently is taking a new approach to cost-cutting whereby revenue and expense are calculated so as to yield a reasonable operating ratio holding a 10% margin above that to be reasonable. Thus, says the company, revenue fluctuation in revenue and expense will not have such disastrous effects on operating profit.

This approach, says Hogan, "has the advantage of providing a measure of relative consistency and integration in to what the allowable investment should be in running a safe base."

So far, flight load factors and high levels of equipment utilization plus tight cost control have enabled us to absorb increased operating costs and thus an imposed profit cut rate.

Currently, load factors and rates of equipment utilization are referring to passenger levels. Whether the current low fare can be continued will depend on cost growth in 1956, the degree of other rate, expense and general efficiency of our operation.

► **Refinement.** American hopes to implement its future growth through the accurate reflectiveness of its administrative staff whereby authority is decentralized and increased responsibility is given efficient in the field. (American Wires May 15, p. 1225).

Increased operating efficiency is anticipated through a reorganization of labor-related departments into one unit under a senior vice president (see chart) and redefining duties of officials for better coordination.

Biggest change is the organization of a customer relations department to handle passenger and cargo services

under vice president R. E. S. Decker. "This will be a small department which will establish the policy and standards by which American will provide service to its customers," president Stroh says. ANA is believed to be the only airline with a department devoted exclusively to such activity.

Only department not changed under the reorganization is public relations. Res. Smith, vice president for public relations, continues to report directly to the president.

Hughes Files Damage Suit for Flying Boat

Long Beach, Calif.—A claim against the city for \$12 million damage to the Hughes Flying Boat, which the property was seized by the Aircraft Division of Hughes Tool Co. here last week.

The flying boat was damaged last September when an earth dike, erected by a dredging company employed by the city of Long Beach, broke. (AVIATION Wires Sept. 28, p. 14). Heavy soil, salt, sand and water crushed the plane, upsetting adjacent structures and hangar.

The statement of claim cited five grounds of liability, including "negligence and carelessness" in the construction, maintenance, supervision, operation, and design and "guarding" of the Long Beach harbor dredging and construction work.

The company said it is continuing to spend approximately \$3 million a year on the astronomical research project.

Boeing Awards Five B-52 Subcontracts

Subcontracts for second-source B-52 production at Boeing Airplane Co.'s Wichita, Kan., plant have been awarded. Successful bidders and the sub-instructors they will subcontract: Cessna Aircraft Co., Wichita, horizontal stabilizer; Bell Aircraft Corp., Buffalo, N. Y., jet engine nacelle; Consolidated Vultee Aircraft Corp., Ft. Worth, Tex., outboard wing panels and vertical fin; Fairchild Aircraft Corp., Buffalo, Tex., landing gear; Avco, Worcester, Mass., aircraft engine; and Lockheed Corp., Middlebury, Ohio, radomes and skins.

Avco is involved in the first contract representing 25% of the gross airframe weight, according to Wayne W. Parker, outside production manager at Boeing Wichita. The contracts are exclusive of subcontract placed by Boeing Seattle.

Contracts are for tooling, production assemblies and a small number of production machine tools. Funds will be required for building construction by the five firms. Total cost: Boeing plans to award additional B-52 subcontracts in the near future.



LAUNCHING PLATFORM for B-52 Mentor is positioned for landing aboard C-114

Missile Dons Seven-League Boots

An unacceptable capability of major units of the Marine B-41 Matador missile points up USAF's ability to plan the pilotless radio-controlled launcher in operation anywhere in the world in relatively few hours.

These photos show a Douglas C-124 Globemaster transport being loaded with a Matador mobile launcher at the mobile missile laboratory at the missile studies laboratory, Md., plant prior to being flown to an operational base. The B-41 is in foreground.

Recently USAF Tactical Air Command received two Matador-equipped squadrons and has sent one of them to Germany, the first overseas deployment of a guided missile unit.

The long-range Matador cruises at approximately Mach .95, flies onto its target at supersonic speed.



MATADOR on launcher, ready to fire



DOUGLAS C-124 Globemaster Matador mobile launching platform with missile to spare

Is 32 the 'Witching' Age? A Hostess Says 'No!'

By William J. Craughlin

Los Angeles—We have just had a look at a document with a higher salary classification than the Hanford nuclear energy plant. It is a list composed of American Airlines' air hostesses who are more than 30 years old.

As you know, American decided to ground all its stewardesses as they reached 32. After a large howl of protest and much publicity, the airline now comes up with the half-baked announcement that those at 32 and thereafter steady flying can continue to do so while a "joint study" is made (Aviation Week Mar. 28, p. 62). We predict they will find some deeply-jaded party. But the company seems that the young passengers it hires from now on will be grounded when they become old ladies of 32. All this resulted in a ground rule. Most of the men in airline uniforms are women who are 30 years old and up.

One wife queried that we just this problem—for more years, which we do not understand since she tells us she is 29—an age which she has been for several years.

► **Dispersions**—Nevertheless, we arranged to interview the other one with one of the few women we have ever met willing to discuss her age as American Airlines stewardess just approaching the deadline. She recited out of the Miss Andya Sembrook, a very determined-looking lady who appears to the skin that she would still be fit to fly on another half dozen flights.

Miss Sembrook is 36, in fact, 36, yes of Miss Andya officially she is another claimant for American Airlines stewardess, who are members of the Air Line Stewards and Stewardesses.

The first thing Miss Sembrook wanted made clear is that she is not 32. She will not be 32 until May 11. Now this may seem like splitting hairs to you but when you

are employed by American Airlines it is a very critical distinction. As to other vital statistics, she weighs 116, wears a 3AA shoe and a size 32 dress. Bust, waist and hips are classified.

► **Writings** and **Chicks**—Miss Sembrook, who comes originally from Akron, Ohio, and New York, on one of C.R. Smith's Pan American DC-3s, visualizes her opinion that American Airlines should judge its girls by moral and personal appearance, not by age. A stewardess does 10, she points out, often is better looking than her younger cohorts and suddenly keeps her head better in an emergency.

"We have some girls who look like witches," she admits, "but we don't have ours into young chicks who don't give two hoots about what they are doing for the passenger."

"We know some American Airlines' passengers men who won't give two hoots about Andya Sembrook after the airplane lands."

"If American insists on setting an age limit," she says, "then let them put stewardess on probation at 32 but as they are when they find start to fly. If they don't come up to American standards, the company can ground them. But it is up to American to supply that when we reach 32, we will become unattractive, ugly and unattractive. It's up to the individuals."

► **Proposal**—If the number of gun women who wanted to stay at Miss Sembrook's, the Hotel Statler, during our interview, is any indication, she is one stewardess who would pass such a test.

As a matter of fact, she suggested a proposal of marriage from Florida after her photograph appeared in the newspapers as among the 69 American stewardesses affected by the average ruling.

"We find that her reply was somewhat of a ruse," she says, "but repeat ing a proposal and beneath quite

as full for any other young ladies with similar problems."

► **Dear Mr. Blank**—

"Thank you for your letter of Feb. 23, showing an interest in our problem of the American Airlines' stewardesses being released from their job when she has reached the age of 32."

"An application for the Air Line Stewards and Stewardesses is traditional, and master steward of American Airlines, I know that we have a lot of work to do before we come to a solution. Public opinion has been in sympathy with the stewardesses, so we may not establish our viewpoint. Truly yours, Andya T. Sembrook, Master Steward, AA."

We think it takes a very bold person to cross a god who moves his pencils in such a manner.

► **Warning**—And we wish to warn the problem responsible for American's distress. The girls know who they are, and we know who they are to be as your stewardess will hardly be any longer a little birdie who has been so long represented.

We are glad to see you have bowed to public demand and reluctantly—temporarily at least—the girls over 32 now are when they find start to fly. If they don't come up to American standards, the company can ground them. But it is up to the individuals.

As Stanton Delaplane of the San Francisco Chronicle puts it: "I do not want any young dibber-dabbers taking off with the complexion as nervous as flight. I want a handmaiden lady with a maturity. It is a good opinion, and I hope everyone will take it into little consideration."

► **Starting to Live**—Miss Sembrook, who has her own ideas about the advantages of being over 32, agrees most heartily.

"A woman just really starts to understand about life, living and the male sex when she reaches age 32," she says, tapping her forehead thoughtfully.

And we cannot help wondering what the French think of all this.

Japan to Open First Postwar Air College

(McGraw-Hill World News)

Tokyo—Administrators of Japan's Transportation Ministry will open the country's first postwar aviation college in July, training pilots, engineers

and navigators under a \$400,000 budget appropriated for fiscal 1956.

One Boeing CT-118 and one Fokker Super Cub will be used the first year. The ministry will appoint 15 Japanese instructors.

The school will be located at a former Navy airfield in the suburbs of Miyazaki City, Kyushu. The pilot

course will have two classes, one for wartime pilots and the other for tyros.

The experienced class will train 10 pupils for three months, giving each 240 flying hours. The inexperienced class will take 18 for two years.

Engineers and navigator courses will take 15 and 18 months, respectively for two months.



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'Navarho' Net

- ACC seeks single system of long-distance nav aids.
- AF device offers greatest promise, report says.

An Coordinating Committee has proposed major revision in U. S. policy regarding worldwide long-distance navigation systems.

New policy is based on three principles:

- To promote the development of a single system of long-distance aids to navigation for U. S. and worldwide standardization.
- To provide U. S. aircraft with a solution to the present air navigation problem with the most readily available and economical system until implementation of the standard system is obtained.

- To support the development and evaluation of new navigation systems that will best meet the operational requirements for long-distance flight operations.

• **Greater Precision**—The USAF-drafted "Navarho" document appears to offer the greatest promise in long-distance navigation, say AFAC members. AFAC is holding a preliminary demonstration of "Navarho" before the International Civil Aviation Organization's Communications Division meeting in Montreal, Canada.

"Navarho" is designed to provide navigation information to aircraft for transocean and transcontinental flights up to 2,000 miles. It is a low frequency system operating in the international band and made for long-range navigation aids and sites not covered with the primary program for VHF long high frequency plane altitude navigation systems such as VOR, DME, VOR/DME and DME/distance measuring equipment.

• **Evaluation Planned**—U. S. will complete the development of the "Navarho" system and carry out extensive testing both on the Atlantic and Pacific routes.

Participation of domestic and international air carriers and airline operators will be invited, ACC says. Results of the evaluation will be made available to ICAO members to promote the standardization of "Navarho" for long-distance navigation.

U. S. will observe for the present the following principles for navigation aids:

- Coordinated operation and expansion, as required, so the location of sites will be supported by U. S. and AFAC members and with a new mutual standard long distance system is adopted.
- Installation and operation of new

directional radio beacons will be not broad where needed and where the beacon facility is adequate.

- The U. S. will provide acceptance and support of standard Coast installations based on operational requirements.
- Engineering of new additional Coast stations installations will be directed toward greatest future integration with the standard system.
- Deployment of long-range aids will be treated to the maximum extent possible.

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Electrical Instrumentation
Philadelphia, Pa.
20,000-300,000
Antwerp, Belgium

Gladden Products Corp., 635 West Colorado Blvd., Glendale 4, Calif.



HYPOTHETICAL TURBOPROP TRANSPORT of estimated 112,000 lb. gross weight with sprayed-on de-icing system totaling 1,064 lb.

Napier Sprays on Its Electrical De-Icer



CONSTRUCTION of heater unit, with cross-section view of coating of sprayed-on mat.

A new electrical aircraft deicing system is applied with a spray gun. Developed by the British firm of D. Napier & Son, Ltd., the system can be used wherever protection is desired, including compound curves and parts too small or difficult to be fitted with other types of de-icer. Price is said to be competitive with other types of de-icers, and maintenance and operation costs negligible.

Basically, Napier's surface heating deicing system consists of a metal heating element sandwiched between two insulating layers. First, a coat of thermosetting resin is sprayed onto the surface of the engine. Then the metal heating element is applied by spray gun to the pristine coat and the required heat distributed. The heating element is fitted with terminals that are connected to the engine's electrical system. Then a dual coat consisting of a thermosetting plastic is sprayed on and polished to a smooth, fine surface.

► Surface Heater Test—Extravagant but

Some Typical Applications for Sprayed-On De-icers . . .



Aviation Siddeley Sapphire jet support duct



DH Comet aileron air intake



Aviation Siddeley Sapphire jet nose fairing



Aircraft Avrocar combustion heater inlet



Fairey Gannet engine intake



Boeing 727 aircraft engine nacelle



Short-Sparrow engine intake



Boeing 747 air intake edge

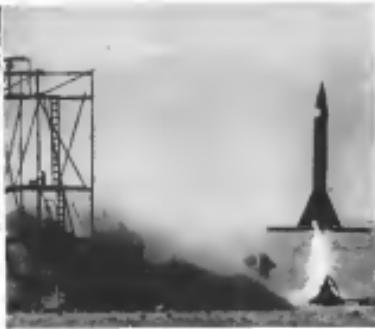
long, including some 1,500 hr. of flight time, has been made of the sprayed-on deicing system on a variety of planes, including jet fighters. For much of the time, a Vickers Viking passenger transport was modified to produce an air flow condition on an extended section on the vertical fin.

The system has also been tried on an English Electric Canberra bomber, which made 180 takeoffs and landings at Khartoum, Sudan, to test conditions in desert.

Tests covering 216 hours on a de Havilland Venetia jet fighter have proved that the material can stand the effect of rain erosion at high speeds and also that the equipment resists air stream levels on the wings of planes using it, states Napier. The mats also have been used experimentally on small



VERONIQUE missile takes off from launching platform, guided by four cables from single drum, which is protected by jet exhausts.



CORRECT ANGLE is assured by drum set up which shortens two lower cables. Cable stress is determined at end of guidance period.



Tether Stabilizes Missile's Launching

Tethered launching is a unique feature of the French high-altitude research rocket called "Veneron."

Developed at the Vassieux laboratory for aerothermal and ballistic research, the rocket has a design altitude of 90,000 ft.

Payload is a bare coil and gas law engine which develops 3,000 lb-thrust at sea level. Duration of burning is 15 seconds. Combustion chamber pressure is reported at 25 psi, and exhaust gas velocity at 6,000 fpm.

Initial stabilization for the launch is handled by a unusual system of cables which unwind from a drum during missile launching.

The drum feeds out along four arms at the base of the firing table and attach to four similar arms connected to the base of the rocket.

From the rocket unwound arms there are four connecting cables to the ballistic assembly connection near the instrument section of the rocket.

During the first few seconds of flight, the rocket rises off the stand and drags out the cables. Since they all come off the same drum, there need be no constant pressure for uncoiling cable tension.

For deflection protect the drum parts from the effects of rocket blast during missile launching.

At the end of the guidance period,

the arms to which the cables are attached is withdrawn by means of explosive bolts controlled by shockwave.

To make sure that Veneron holds off at the desired angle at the end of the guidance period, two of the four arms of the drum are profiled so that the two outer cables are shorter than the outer two.

This system believed to be the first use of such a scheme anywhere has proven successful in flight tests made by the French laboratory.

Veneron is 21.6 in. in diameter and 19.6 ft long. Takeoff weight is 2,100 lb. Velocity at burnout of the engine is about 3,100 mph.

THRUST & DRAG

"Holy Mackerel!" comes the engineer. "Where're you been?"

"I was," I said. "And you?"

"I've been down in Texas, getting the lowdown on the guided missile business from a cutthroat. I figured there was so much hell in the program that Texas was the place to go."

"What's the conclusion, other than the bottom?" I asked.

"Well, the engineer compared a good guided missile to a M-16 rifle. They may not be lightweights only. When that heat goes going on Sunday afternoons, there's nothing can stop him. He blasts out of the head door with one thought: Suret that silly looking two-legged thing across the ring. He's not pretty, but he's a helluva killer."

"Very next analogy," I admitted. "Any more?"

"Sure," said the engineer. "This Texan said that the trouble with us is that we've treated the guided missile like a poor French hound at a stock show. They proper hounds, though, like a fox hunting dog, and they have down in the front legs, like a fox. He would kill somebody if they acted up now and he felt that he had to, but about the only damage thing he's good for is probably some of his own kind."

"And that," concluded the engineer, "is one of the most sensible things I've ever heard about the guided missile program."

Speaking of missiles, I wonder if the Wright people looked at the unashamed version of a good dictionary before they lit somebody's face in the name of Regis, for their names?

Sure, it's named after a star. But the dictionary says that Regis is also ... a pretty-faced, talker of little power or consequence, the more or less contemptuous man at court ... in marching and reducing eyes."

With remarkable consistency, the no-thrust engineering lesson facility, the B-57s, has again defined a proposal to admit women to membership. We took up the cudgels once before on this score, and the club's still at it.

The drama is finally, think. That, of your wives and daughters who might hear about this discrimination against them see. Will all the fun about women's rights be forgotten?

Men in well fact it, men, the women are here to stay. Some of them will be engineers. And more of them will be better engineers than you are now.

Most of them are pictures, too—DIAA

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New Inventions

Government Offers Patents for License

New patents issued recently or soon to be issued to the U.S. in the field of aircraft and parts have been reported to Aviation Week by the Government Patents Board.

They are listed below in a new reader service that will appear in the Board's monthly issue.

These inventions are available for license or assignment on a non-exclusive, royalty-free basis, on application to the agency indicated in the abstract. Printed copies of letters patent may be obtained from the Commissioner of Patents, Washington 25, D. C. It costs 8 cents a copy, payable by check or money order.

► GROUND RELEASE FOR CARGO PARACHUTES. Patent No. 2,683,500, issued Jan. 17, 1954.

A quick release parachute which automatically releases the load after it touches the ground comprises a load retaining lever pivoted at one end and actuated at the other end by the catch of a spring loaded lever having a serrated edge. Usage: A ground release device for automatically releasing a load to hold the sprung load in a lecture position for a predetermined time after the parachute opens. Inventor: Randolph Clegg. Administered by the Office of the Judge Advocate General, Department of the Air Force, Washington 25, D. C.

► JACKER BOOT ATTACHING TOOL. Patent No. 2,683,504, issued Jan. 17, 1954.

A tool for applying a rubber booting boot to the leading edge of an airfoil wing or other aircraft surface. The tool has a base which has a weight which is adapted to be held in the sole of the boot. The outside of the booting device is provided with a pair of jaws which are adapted to engage ends extending from one edge of the boot. When the jaws are closed, the weight held in the boot causes correct alignment with a leveling strip on the wing or aircraft. Inventor: Raymond F. Martin. Administered by the Office of the Judge Advocate General, Department of the Air Force, Washington 25, D. C.

► RADIO COURSE INDICATING SYSTEM. Patent No. 2,683,514, issued Jan. 19, 1954.

A navigation system for use on aircraft comprises a radio system for receiving a variable frequency signal from a ground station for generating an oscillator and a modulator which is instant to the ground track of the aircraft. The modulator generates a continuous oscillation of a carrier or not the aircraft is flying a circular course around the radio beacon. The system includes a receiver for receiving the signals of radio stations from the ground for each revolution of the antenna and means for adjusting the phase angle between the antenna and the signal means. Inventor: Boris Chertov and Ivan A. Gomzov. Administered by the Office

of the Judge Advocate General, Department of the Army, Washington 25, D. C.

► AIRCRAFT FUEL AND PROPELLER PITCH CONTROL. Patent No. 2,687,225, issued Jan. 26, 1954.

In an aircraft propeller having a gear ratio, driving a propeller pitch gearbox through a transmission, an electronic circuit has means responsive to the operating characteristics of the turbine and propeller, such as torque, temperature and speed. The response of the engine is used to control the flow of fuel to the turbine and the pitch of the propeller to produce a constant rate of ground speed. Inventor: Clegg F. Wood and Carl L. Stroh. Administered by Patent Counsel, Department of the Navy, Washington 25, D. C.

► PLURAL MOTOR CONTROL SYSTEM FOR USE WITH TRANSLATION DEVICES. Patent No. 2,687,416, issued Jan. 26, 1954.

A double motor control system for use in bridge type radio apparatus with a motor having two independent windings and an amplifier circuit to supply control voltages to the two windings of the motor so as to move the model along any desired path. The system includes a mechanism for continuously reading a quantity proportional to the position of the body and a motor driver having two independent solenoids parallel to the two permanent solenoids used for controlling the two motors to produce component reduction of the body parallel to each of the two permanent solenoids. Inventor: Robert W. Williams. Administered by Patent Counsel, Department of the Navy, Washington 25, D. C.

How Ought We Train Rocket Engineers?

The best way to train rocket engineers is under the present engineering programs rather than an accelerated course.

This advice comes from Prof. Paul F. Tacke, chairman of the department of aeronautical engineering and aircraft design of New York University's College of Engineering.

Prof. Tacke was speaking at a star panel at a meeting of the American Rocket Society, and said that a firm grounding in basic engineering sciences combined with either experience or graduate study in both will prepare the engineer more thoroughly for rocket research and development.

According to Tacke, these general engineering courses should be offered for rocket work. Mathematics courses specializing in thermodynamics and heat transfer, thermal energies, concentration as heat and turbulence, and structural load response with selective training in aerodynamics and structures.

Panel chairman was Dr. Morris Szwarc, Florida Institute of Technology. The meeting was held at the American Museum of Natural History.



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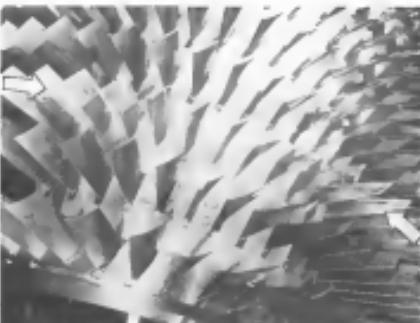
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MCGRAW-HILL
PUBLICATIONS



GLASS-PLASTIC BLADE has 6-in. surface finish metal dovetail slot.



TEST COMPRESSOR CLOSEUP shows 8-in. glass-reinforced plastic blades in their outer stage (jacket). Blade length is about 4½ in., chord about 1 in.

Glass-Plastic Blade Passes 100-Hr. Test

By Irving Stone

A 100-hr. test at rated engine speed has been completed successfully by Thomson Products, Inc., a Jet Division. The blade, intelligently composed of the most robust use of the material in a robust structure, consisting of the sprouting fibers involved.

It is reported to be the first time

so high a total of operating hours has been clocked up for the material or in

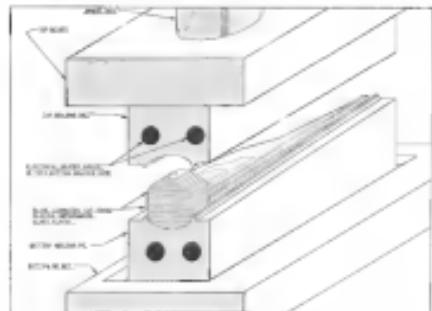
application of this kind.

Results—The blades which completed the 100-hr. run were developed by Thomson Products, Inc., a Jet Division. The blade intelligently composed of the most robust use of the material in a robust structure, consisting of the sprouting fibers involved.

► **Next Phase**—Thomson considers its plastic blade development strictly an experimental project at this time. Next step in the program, now that the damage potentialities of the blades have been defined, is to see precisely how they stack up for the job they should be expected to do in service. Then, in the second stage, operation of plastic blades will be fitted into a more complete outer stage of a turboprop compressor for test, with full instrumentation. This, coupled with other information, Thompson is gathering, should result in compilation of qualitative data to assist design engineers in evaluating the practicability of using the plastic blades in compressor applications.

► **In R. Field**—With on Thompson's plastic blade project started about 16 months ago and has been carried along entirely as company funds at the jet division. It has published information that glass-reinforced plastic was being studied for compressor blade service application. *Aviation Week*, Mar. 2, 1953, p. 104).

The program was undertaken be-



LAYOUT of glass-plastic compressor blade (below crosscut) is the blade's

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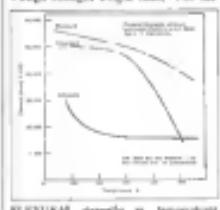
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moved, it is about 98% complete. At this point, the dimensional accuracy is not as good as can be attained. Plugs can be fished off with the fisher.

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Root configuration used is a dovetail wash in the form of an aluminum alloy die casting, requiring no retensioning. It is not recommended as being the optimum method for anchoring the blade, and Thompson is continuing to explore the various aspects of retensioning.

PRODUCTION BRIEFING

► **Planes Helicopter Corp., Merion, Pa.,** has leased 24,000 sq ft of space at the former Autocar plant in Ardmore, Pa., 12 mi. from the engine firm's main plant. The acquisition, which will nearly double Blawie's effective production area, will be used to make composite components and is in line with Blawie's policy of reducing its subcontracting to maintain an even level of employment.

► **American Helicopter Co., Inc.** has come out of options to lease for another three years in lease on the 35,600-sq-ft, Dallas Field Area, plant and plans to install additional polyjet engine testing facilities.

► **Reeve Corp. of Austin, Wallingford, Conn.,** has opened a new plant in Meriden, Conn., slated to double production capacity 98%.

► **Torras Aircraft Corp., Greenville, Tex.,** recently is working on a contract to construct a "large number" of USAF Douglas C-47s, with completion scheduled for early 1973.

► **Metz Plastics Co.** has opened a larger plant at 11751 Mississippi Ave., Los Angeles, Calif., which will include present offices and facilities, plus room for output of a new and improved line of durable, pliable molding compounds. The new units, made of UHMW, Teflon, electronic triggering devices, solenoids, electronic logic, dimension devices and other applications.

► **Midwesters Corp., Ingleside, Calif.,** metal fabricator and maker of special welding parts, has extruded the special valve body covering high temperature, synthetic oils, fuels and chemical lines.



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ment hours, and by unparalleled experience—11,795 units produced and 15,500,000 operating hours.

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These are just a few examples of how

AiResearch engineers constantly produce more efficient products. By engineers constantly achieve higher performance from smaller units of less weight.

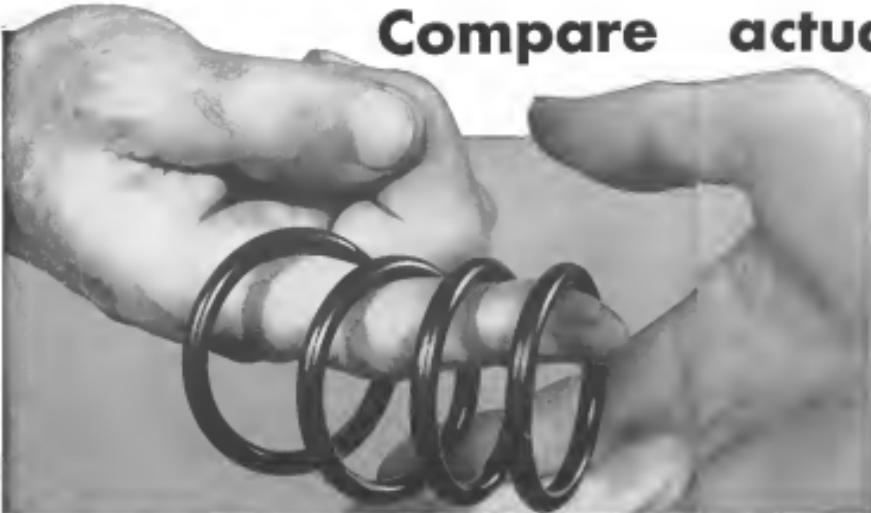
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Arinc Pinpoints Military Tube Failures

- Removals could be cut by better maintenance, careful handling, use of fault-predicting devices.

By Philip Kline

Half of the tubes removed as defective from military electronic equipment often have no apparent defect or the defect appears to be caused by rough handling during maintenance. The other significant disclosures on the reliability of electronic tubes in military applications are made in a recent report by Avionics Inc., Inc., in its military tube study.

The Arinc report shows that the equipment designer, military service, and to some extent the aircraft manufacturer, must share the blame with the ultimate tube manufacturers for improved equipment reliability will depend on the efforts of all concerned, the report indicates.

► Most Encouraging—The Arinc program, most extensive ever attempted, has used nearly half a million tubes operating in 44 different types of Air Force, Navy and Army equipment at eight different bases.

The report's conclusions are based on a study of 95,000 tubes removed as defective during the period of Sept. 18, 1951 through May 31, 1953. An analysis of another 43,500 tubes removed during the balance of 1953, but not included in the original report, confirms the earlier findings, an Arinc spokesman told Aviation Week.

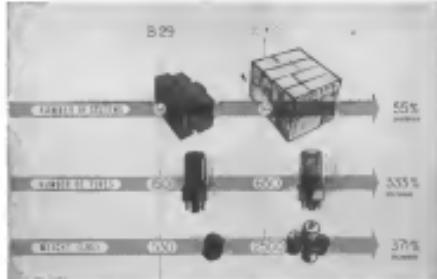
► Defects and Failures—Arinc's study showed that 45,800 tubes removed as defective.

► One-third appeared to be free of defect when later tested in the lab, indicating that tubes removed should be checked to incorporate maintenance personnel and inadequate test equipment or maintenance procedures.

► One-third were deterioration failures due to natural aging which could be detected in advance by "fault predicting equipment" (AVIATION Week Nov. 24, 1952, p. 51) and removed before they caused equipment failure.

► One-third showed damage which was probably the result of handling during tube installation or equipment maintenance.

► One-third were catastrophic type fail-



TREMENDOUS GROWTH in number of avionics systems in modern aircraft emphasizes the problem of tube failures is a challenge to industry and the military.

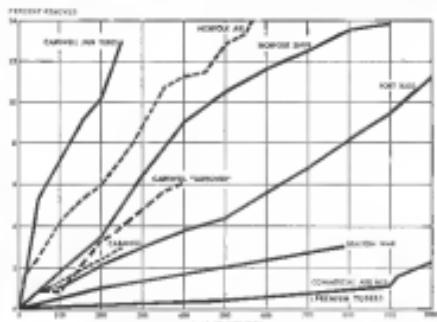
ures which would cause sudden and unpredictable equipment failures.

► Tube Removal Rates—Arinc found a wide variation in tube removal rates among the eight military agencies participating in the program. The variations reflect the different environments in which the tubes and equipment operate and the maintenance conditions at each base.

The eight participating groups in

cluded three Air Force bases (Carswell, MacDill, and Bergstrom), one Naval Air Station (Cabrillo Field), Nellis Air Force Base (including both aircraft and electronic equipment), Radio Station WAFR (Wright-Patterson Army Base), Wright-Patterson, and Fort Monmouth.

Reliable tube mortality was recorded at Carswell AFB, where an average of 10 tubes per hundred sockets were removed as



TUBE MORTALITY CURVES in Arinc report show that tube failures depend on operating environment, quality of maintenance and use of previous type tubes.

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GI MAINTENANCE personnel find it difficult to cope with growing complexity of military electronic systems.

the first 100 hours of operation. Lowest removal rate was for Station WAK, where replacement averaged 3.4 per 100 switch 100 hours. On the other, 52% WAK personnel type, 100 hours were used, Council's replacement rate dropped to around 1.5 per 100 switch per 100 hours.

Average removal rate for all tube types under surveillance (JAN and primarily) at all bases is between one and three per 100 switches/100 hours. Lowest replacement indicates that a specific previous type tube last two to four times longer than its JAN counterpart, Army reports. The switch replacement might be even greater.

► **Antennas**—An Army survey shows that antenna replacement rate for permanent type tubes is only 4.3 per 100 antenna hours. This is the rate for comparable tubes at McConnell AFB, for example. There are logical explanations for this difference.

Antennas are less complex equipment which has had a longer period of debugging; they have relatively well-trained and permanent maintenance personnel. As a result, antennas have been able to lend tube removal substantially to mechanical or catastrophic failures and to those tubes that have worn out themselves to the point where they are near the end of useful life, according to F. R. Stevens, who is exp-



TEMPERATURE'S ROLE in tube reliability is shown by drop in failure of G-106 and 6008 tubes in tube bonding system when operating temperature was cut.

reasing manager of the Army surveillance program.

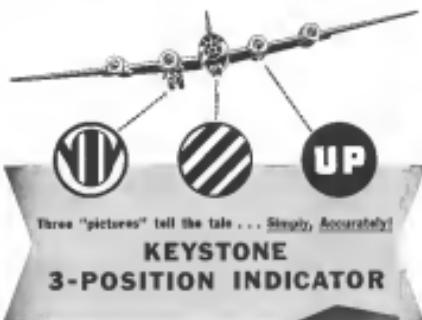
► **Bombshells and Trap**—The airborne figure provides a good benchmark for assessing the reliability of newer permanent tubes under new-operating conditions and gives the military a target at which to aim.

The job of reducing replacement rates faces present tube figures to provide a job for the tube maintenance.

The job of getting military replacement rates down to the airborne figure is generally not for various equipment designers and the military services, with some help from tube and aircraft manufacturers.

► **Coping With Complexity**—According to the Army breakdown, there is a need for tube maintenance could do to prevent half of the military tube replacements (over 700,000) they diagnosed tubes with solder type anomalies caused by the flowable plug is loose. These replacements need to be the first that can cause cause military maintenance costs to increase exponentially of present replacement, Army says.

At three of the participating bases, Army says, "maintenance is performed by systematically trained but inexperienced enlisted personnel and tubes are frequently removed in clusters because reinsertion . . . have not always the base,



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knowledge, are functions for distinguishing between good and bad tubes.

► What Causes Naturally? It is difficult to even impossible for maintenance men of average technical background to identify the true source of trouble. The tendency to change tubes rather than to define into the true cause also has a psychological basis, in that tubes are easy to change and are considered relatively cheap." The Arinc report says. It adds, "The only available method of quick trouble-shooting."

Aricn cites the electronics school at one base where maintenance men are taught in troubleshooting techniques by inserting defective tubes to create equipment malfunctions. This school's seemingly ridiculous recommendation to inspect tubes when they later encounter equipment failures.

► Damage From Handling—"The obvious of damaging a tube while it is placed in is a conduct, point-to-point handling and vibration of tubes may easily defeat the very purpose for which it was justified by introducing some defective tubes than it detects. If an equipment is to be subjected to a rigorous environment, it should be designed to provide protection for handling so that maintenance may be carried out with a minimum of tube handling," the Arinc report continues.

"With vibration and vibration-free tubes, base plate can be damaged easily or broken in the process of removal or installation.

► Waste of Time—At one AF base,

Aricn data showed that some tubes were replaced 50% of the time when trouble was first encountered in the service, yet 30% of these removed tubes later showed no defect. The report concludes that "under these circumstances, trouble-shooting by replacing tubes in a waste of time" (and) "will become even more true" (as wider use is made) of such tube repair."

Aricn found exceptions, for example at Strategic WAR where it reports that maintenance personnel had proper training, tools, and time to do a good job. However, the report concludes that "while the maintenance situation can and should be improved in perspective, the use of natural troubleshooting is cannot be expected to be any better than at present, and it will probably be worse."

► Challenges to Diagnosis—"Frequent maintenance involving excessive handling and vibration of tubes may easily defeat the very purpose for which it was justified by introducing some defective tubes than it detects. If an equipment is to be subjected to a rigorous environment, it should be designed to provide protection for handling so that maintenance may be carried out with a minimum of tube handling," the Arinc report continues.

"This program toward improved reliability will be feasible only if simplicity is placed in the design of equipment for easy servicing rather than as the

improvement of maintenance (pursuant)."

The report urges designers to provide:

- Uniform construction of sub-assemblies, with provisions for quick replacement.

- Modularization indicates built into each subassembly, or an automatic system to "eliminate the troubleshooting" entailed from the system."

Although this may increase system complexity, Arinc believes that reliability will nevertheless be improved.

► Magnal-Tekno-Magnal—Results of the investigation programs show that equipment is now designed highly successful in performing all its operations and that no usage of performance is left in reserve for survivable circumstances in any kind of emergency," the report says. "This can put an additional heavy burden on maintenance, maintenance and operating personnel."

For example, it is not enough to design equipment to perform satisfactorily when tube transconductance is within the range called out by JAN or MIL spec for new tubes. A properly designed equipment, the report says, should perform satisfactorily and transconductance by tubes in the limit specified for maximum JAN life test.

To illustrate its point, the report says that 47% of a batch of GAK-7 tubes replaced for low transconductance, demanded by poor equipment performance, were actually higher than the value specified. For maximum JAN life test, one would have been acceptable if the equipment had been properly designed by Arinc standards.

► Another Example—When tubes with very high gass are employed as paramodulators in servo amplifiers, tubes with very low microphonics output are usually required, the report notes. In many cases, equipment manufacturers' present tubes get out with low microphonics output. When it becomes necessary to replace these tubes in the field, the maintenance men often does not know of the low microphonics output required, as the old tube sufficient to break a new one.

The result is unsatisfactory component performance and so the tube is replaced again and again until, by mere chance, one with low microphonics output is found, the report says.

Another version of the same problem occurs when a manufacturer selects a tube like the 4413 (present version of the 6887) for its low microphonics, but fails to note on the chassis or in the instruction book that the 6887, its electrical JAN equivalent except for low microphonics, cannot be substituted if a part 6113 is not in stock.

► Good Bell of Health—Out of 11,000 different incoming tube applications

studied, Arinc found only 40 anomalies in tube specification. These are usually so slight, however, of little significance to tube manufacturers.

More subtle kinds of misapplication which produce only slight tube handling and cause only minor reduction in equipment reliability are much more difficult to detect. Examples of this type include tube use:

- At maximum rating when another type is available which could be operated at a more conservative rating.
- Where not designed for particular application and where a more suitable type is available, such as using a pentode in a triode connection.

Aricn notes that the total effect of many subtle types of misapplication can be more serious than a single serious misapplication of one tube type.

► High Temperature Fatal—Failure of many of tubes discussed very rapidly when tube temperatures are allowed to reach 200°C in unit plus tubes manufactured with normal processing. Arinc reports. Keeping tube temperatures within the limits of the tube manufacturer, equipment designer, and the aircraft manufacturer who locates the equipment in the aircraft, and thus determines its ambient temperature.

In one radio homing system, failure



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Automatic data reducer, developed by Look-Land Aircraft Corp. engineers, translates and records telemetry circuit output into digital logic data on magnetic tape, converts it into binary code which is recorded on punched cards for later use on automatic computers or graph plotters. The electronic computer uses data reduction time from a period of several weeks to as little as two-three days.



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rate of 6.4Rbs used in the power supply were first to five times higher than the average of all other tubes used. Investigation showed that the temperature of these tubes reached 109°C during flights above 30,000 ft., roughly 100°C above maximum rating, with the power supply satisfied in an apparently normal manner of operation.

► Power Supply: Two corrective measures were taken: transfer of the power supply to a pressurized zone, and insulation of more effective blanket in the apparatus. A temperature check after selection showed average tube temperature had dropped to 83°C for all 6.4Rbs and their power consumer

parts, type 6098. The change was made at different times in various aircraft but in general went unreported during the second quarter of 1952.

Tube replacements of the 6.4Rbs and 6098 dropped sharply from an average of 5.1 to only 0.3 for a four-month period (see graph, p. 25) during which the improvements in insulation tube temperature research in thermal insulation was significant change in replacement rate of other tube types used in the same heating system.

► Operating Procedures: Operating procedures have an important bearing on tube reliability, a fact which the engineers who write extraction books

operating placards, would do well to note. For instance, it has been common practice to assume flight crews to put fire control, autopilot, radio, and similar gear in standby conditions so that tube heater will be energized and the tube will be ready for instant service when needed.

Long periods of standing operation, with batteries discharged but with remote power off, can induce interelectrode corrosion on tube cathodes, a major cause of tube performance deterioration. New data shows:

Improper operation of a radio transmitter which produces main tube dissipation through improper use of a receiver, which is one explanation for the higher mortality of transmitting tube types. For example, an unadjusted tuned radio transmitter can result in high power dissipation, which in turn can produce a variety of tube failures.

► New Findings: Out-land's report does not make any experimental conclusions for corrective action, much of the report is devoted to Aran's findings on takeoffs and landings — their comparative mobility rates and such visual weaknesses. A report on these findings will be the subject of a later Aviation Week article.

Many aircraft engineers designers can justifiably shift a portion of the blame for poor use to the military. All too frequently in the past the military services have insisted on specifying all possible use, weight, and performance out of a new type of equipment, at the expense of reliability, resulting in heavy losses in the field away from availability. This was not an expensive military when, but a responsible expense for the need for more and more intense equipment without compromising aircraft performance or range.

► Recommended Reading: Without attempting to place blame, the Aran report documents the consequences of poor use and insulation.

All segments of the industry, including military engineers who supervise industry's development, should well study this long awaited report and its corrective reports following. Copies are available for 25 cents from U.S. Dept. of Aviation Radio, Inc., 1511 "U" St. N.W., Washington 5, D.C.

Transistors Simplify Fuel-Gage System

The aircraft's first completely transistorized weight fuel measuring system (capacitor-type) has been developed by Minneapolis-Honeywell. The new device is 75% lighter, 50% smaller, and uses less than half the power of comparable vacuum employing electron tubes. M-H says:

The new fuel gage, first shown at the

operating placards, would do well to note. For instance, it has been common practice to assume flight crews to put fire control, autopilot, radio, and similar gear in standby conditions so that tube heater will be energized and the tube will be ready for instant service when needed.

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recent national TAC convention, was MHI's recently announced power-type transmitter which develops sufficient power to drive the panel indicator. Expected accuracy is maintained through the temperature range of -67° to 165°, comprising any.

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Big Airports to Get New Bendix Radars

Improved Bendix Radio altimeter and precision approach radars are slated for installation at 31 major airports, including several equipped with older ASR-2 and PARs.

Important new feature of the ASR-3 traffic control radar is an automatic distance scale which identifies an aircraft during its radio transmission by running a line through the airplane's bay as the radar scope.

► What They Go—The new ASR-3, now being tested by the Civil Aviation Administration at Baltimore's Friendship Airport, will replace older equipment at LaGuardia, N. Y., International, Chicago, Washington, Atlanta, Los Angeles, Boston, and Cleveland airports, presently without radar; at Louisville, Louisville, Nashville, Ft. Worth, Miami, Newark, Denver, and Buffalo, will also get ASR-3.

The new PAR-3, under test at Philadelphia International Airport, will be installed at Pittsburgh, Detroit, Cleveland, San Francisco, Portland (Ore.), Seattle, Kansas City, Indianapolis, St. Louis, Dallas, Houston, and Anchorage (Alaska), as well as replacing an older

• Metal

• Silicone

• Rubber
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Metal—Natural Rubber—Silicone
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Over 27,000 basic designs and
their variations are already
available from which to choose.

TOP—Close-up of 445 Series power plant showing aluminum-alloy engine design.

BELOW—Inertial gyro and electronic flight control system in aircraft's right wing.

TODAY'S FINEST EXECUTIVE AIRCRAFT
FLY WITH THIS DEPENDABLE POWER

Behind the growing dependence on airplanes as adjuncts to business is the fact that our company offers a service that goes far beyond paying the way. As pioneer and leader in utility aircraft power, Continental Motors finds solid satisfaction in its role as engine source for the outstanding planes of this type. It has every reason to believe that the performance of these engines—their power, economy and dependability as proven in thousands of hours of flying—has not only a major factor in the leadership of these aircraft, but one destined to assure their ever-widening use.

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Continental Motors Corporation
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set at Newark Airport in New Jersey. ► **Other Features**—In addition to ADP provisions, the Bendix ASR-3 provides moving target indication (MTI) which enables radar operators to blot out radar echoes from fixed ground objects, leaving only airplane targets. (The General Electric ASR-2 also has MTI.) The ASR-3 also provides video mapping which registers a ring of the surrounding area on the radio scope to indicate obstructions or other danger areas.

Conular polarization, which greatly reduces noise clutter on the scope during a storm, was not provided but is not called out by the CAA specs, a Bendix spokesman says. The company reports it currently has orders for GCA's from several foreign governments for contracts at Copenhagen, Gander, Bombay, Frankfurt and Hamburg.

FILTER CENTER
55152

► **Expert Visit Air Arm**—Dr. Bert Wulfford and Dr. Simon Russo have been recent visitors to the Whitinghouse Air Arm plant in Baltimore. This promptly speculates that they are new commitments to Air Arm, which was then biggest competitor in the interceptor market. Dr. Wulfford and Russo and Wulfford were formerly the technical arm of Hughes Aircraft Co. They also with Air Arm's newest version recently led Navy to cut back its production, at least for the time being.

► **Comets Get Flight Directors**—Air France has purchased Colgate-Rohm Company's integrated Flight Systems for use on aircraft of the Royalized Comet II and III, Colgate reports.

► **New Digital Computer**—Riley-Jacobs Instrument Co. has proposed to USAF a digital computer for use with flight simulators, claiming advantages of versatility, accuracy, cost, size, and ease of maintenance and usage. Computer proposes to use the Janusyc-2 or -3, developed at Aviation Week Feb. 1954, p. 45.

► **New Gyro Consultant**—Henry Koen, former chief engineer of mechanical instruments at Elgin Pointer Division of Bendix Aviation, has joined the Kestrel Co. to do consulting engineering in gyroscopes, instruments, and controls. Company offices at 101 N. Franklin Turnpike, Hahoka, N. J.

► **F&M Avionic Weight Reduction**—Lair has proposed to USAF a modified version of its F-5 weightless new and on the F-5D, which could save 25 lb of weight, eliminate much duplicate avionic gear now carried. New "Super F-5" would eliminate need for separate two dials, because indicator verified gyro, heading indicator, directional gyro,

MORE LEAR AUTOPILOTS WERE PRODUCED IN 1953 THAN ALL OTHER MAKES COMBINED!

Union driving fasten-
ers during overhauls
on each skin panel.
Results: costly.



Using angle 10-SHEAR
plate and collet, it
removes rivets quickly
and in one stroke.
The total stroke
permits weight.



your double dimple solution

Now, your aircraft design can be more
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The 10-SHEAR collet is
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HOT-UP, the 10-SHEAR
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weight, space and time.



LETTERS

Misdirected Efforts?

The comment on flying boats by Clarence Chamberlain, *Aerospace Week* (Feb. 13, p. 102) was most interesting. I already see we might find a way to share and more such marine transport from our extensive shores, based, as I et al. did in the case, on a lifetime of experience in the field.

It is not true that much of our sea
line effort is wasted.

Most of our present effort is in the classi-
fication of marine transportation, ocean logistics,
wave power, wind power, ocean energy,
area of land use, cost of freight, shipping
and electronics, radio astronomy.

With p. 6 of the article, nothing measured
with water, and the water touching the
shores and forming the harbors of every
populated area on the surface, we still
see biggest and best places to open from
the ocean.

We severely limit them and greatly re-
strict their mobility and ability by dredg-
ing them to operate only from a head sea
way (or breaking dock), that

- Costs millions of dollars to build
- Can be wiped out by a single enemy
torpedo.

- Naturally it is far removed from any
inhabited population that secondary costs
of manipulation is necessary to aid from
such population area, of the primary meas-
ure to be taken.
- We should note that new technologies
rought in order, based on the overall
problem.

The solution will be forthcoming when
we combine the experience and lesson of
the past with sound judgment and judicious
research.

J. R. Krawiec, Avantek Design Engineer
906 Fairfield Ave.
Budapest, Conn.

Playboy's Price

I read an interesting article about Playboy
Highways in *Aerospace Week* Jan. 23. It
was mentioned that the cost of flying
Commercial aircraft. The
same price: regular route costs \$1,000
in Japan. I am writing more details from
you with gratitude in advance.

Kenjiro Asanuma

777 Transocean

Minato, Tokyo, Japan

(The price of the Playboy 400 is \$395,
which does not include engine. The Playboy
is manufactured by Step Aircraft Co.
P.O. Box 1918, Riverside, Calif.—Ed.)

Pilot Viewpoint

Regarding Rulon's "Copilot Viewpoint"
and his thoughts in summary to Jan. 25,
1964, it is a fine compilation every time it
is read. I would like to add a few comments.
However, I would like to point out that the DC-7
is the first commercial Douglas airplane which
comes over with the vacuum system and not
all electric instrumentation.

For American, *World Airways*, DC-6s and

DC-7s (Military Model)

AIRPORT WEEK, April 3, 1964

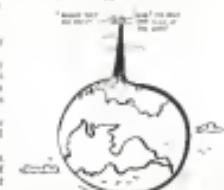
DC-8s, *Compania Mexicana de Aviacion*'s
DC-8 and DC-10, but *Boeing* produces
New York, *Boeing* to the *Boeing* instrumen-
tation. PA's extend of electric systems for
that fleet of *Boeing* CV-1000 transports
different since year ago.

W. A. DEL VILLAL, Resident Engineer
Pan American World Airways Systems
Division, Avionics Div., San
Juan, Puerto Rico

(The writer of the original article was
not available to answer when asked that the
DC-7 was the first Douglas plane with all
electric auto controls.—Ed.)

High-Flying Comet

I regard your response in the *fairest* and
most comprehensive publication pertaining
to aviation technology. I had a long career
in aircraft design and development, and
can assure you that the Comet is indeed
unique and unusual. I was somewhat amazed,
however, at the type in "Comet 2 Test."



on page 38 of the Feb. 1 issue. I know
they are going Comet rugged tests and
dry, but, really, not flying from a 5,000
m high field a little problematical.

W. H. McNease
4137 Vizier St.
San Diego, Calif.

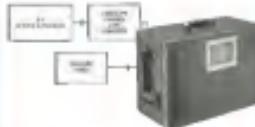
To quote from page 1 of Feb. 1964 issue,
"The original 707-121A aircraft will
be the first to be delivered to Pan American
to test performance off a 5,000 m high field."

As we really lie behind the British
Corr. Jones J. McNease
Air Force Flight Test Center
P. O. Box 9-49
Edwards, Calif.

(We are keeping an unabashed pool
re the difference between us and it
—Ed.)



DECIMAL KEYBOARD—Consists of a three digit push
button keyboard with a decimal point. It is
used for direct input and places logarithmic values
into a digital computer. Size: 4 in. x 11 in. x 6 in. Weight
of one.



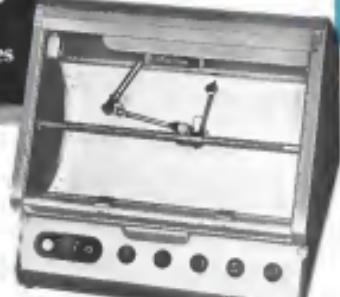
PUNCH CARD CONVERTER—Converts punched card data
to an analog form suitable for input to a PDP-10. Input
data formats are decimal, binary, and floating point.
Output formats are decimal, binary, and floating point.
Size: 16 in. x 16 in. x 16 in. Weight: 100 lbs.

**X-Y plotter
and recorder**

**simplified recording
of two independent
variables with greater
selection of input devices**



10.0 INCHES: A million full scale readability in 10.0
inch. Input input resolution 16 bits. It is with
2 degrees input resolution about 2 bits.



A compact, desktop unit that accepts
either analog or digital inputs. Standard
digital converter, Decimal Keyboard,
Decimal punched card, and Binary Inc.

Computer Output, Handheld computer
switches, and step attenuators with
out word. Frequency: 100,000 cps available
in consumer specifications. Full chart

width allows observation to even current
generation in all cases. Unique pat-
ented for fast, dependable performance.
Write for full catalog information.

Designs, develops and manufactures
in search of advancing instrumentation
advancement, and jet aircraft air-transport.

To write Dick Hastings, Personnel Director

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TCA Reports on Freighter Operations

Airline reworked various Bristol features to fit craft for rugged northern operations; personnel like the ship.

By George L. Christian

Montreal—First tangible evidence of Trans-Canada Air Lines' two-pilot freighter operations came with the arrival of the liveries of three English-built Bristol Freighters (Aviation Week Sept. 7, 1953, p. 49). The planes were put into service just before Christmas of last year to help with the holiday rush of mail and packages.

Other aircraft will soon join TCA's current fleet at 23 North Shore, 36 DC-3s and 11 Freighters. They are eight Turbo-Compound powered Super Constellations and 15 turboprop-driven Vickers Viscounts. The latter will give TCA the turboprop transport lead in North America.

Engineering & Maintenance

Although the Bristol 170 Freighters are still relatively new to TCA engineers and maintenance personnel, they told *Aviation Week* that their preliminary impressions of the aircraft and its Bristol Hercules engines is that they will give a minimum of trouble.

► **Simple and Rugged.** E. Pritchett, TCA's regional manager of maintenance at Malton Airport, Toronto, was pleased with these features of the aircraft.

► **No hydraulic system.** Bristol eliminated the hydraulic system on the Freighters. Landing gear is fixed, flap and brakes are pneumatically operated and windshields wipers are electric.

► **No visual system.** TCA had the Freighters modified to eliminate all interior flight instruments. Therefore, visual flying is accomplished by pump-down oxygen tanks through pressure relief valves or so-called "leak-off" valves, no oxygen tanks or auxiliary oxygen.

► **No load shedding system.** The Freighters' maximum takeoff and landing weights are the same—44,000 lb. TCA eliminated the requirement for load shedding equipment to bring the plane's landing weight down quickly in case it becomes necessary to land immediately after taking off at maximum gross weight.

► **Fluid gear.** Main and tail wheel landing gear are fixed. While undoubtedly slowing the plane in flight, the fixed gear elements need for heavy launching equipment are eliminated, maintenance is simplified, and the hydraulic system for engine power required to extend the gear. The fixed gear is extremely rugged—with much of the bending imposed by landing on rough fields or snow-covered hills and rivers.

► **Easy to Handle.** Freighters pilots report that the plane handles well and makes "smooth landings."

One pilot expressed his opinion this way: "The machine flies like an Avro Anson in the airways and good on the elevators." The plane has excellent climb characteristics and generally performs much better than expected.

During a flight on the Freighters from Montreal to Toronto, another TCA captain told this reporter: "The aircraft handles more like a monoplane than a transport. . . . The plane's servo tabs

make the controls very light to handle, making you at first tend to over-control the ship. . . . It is easy to hold even full rudder in case of single-engine operation."

► **Off the Shelf—TCA bought as three Freighters "off the shelf." At a cost, it had to sit through certain modifications be made by Bristol, or scrapbook them in its own eventual design after the aircraft had been delivered.**

Here are some of the main important modifications performed by TCA on its Type 170s according to F. T. Mason, TCA's special maintenance engineer:

► **Revised electrical system.** The electrical layout in the cockpit had to be changed. All the instruments were involved. Some were mainly relocated to conform to TCA's standardized instrument layout. Others were removed and replaced with other instruments which fit the new panel.

For instance, nine dual-moving flight instruments were replaced with circu-ally damped units. Adjusting current for the instruments is supplied by two inverters operating off the main bus. The output of either is sufficient to meet all air needs. TCA procedure calls for using the even-numbered inverter as all even-numbered flights and the odd-numbered inverter on odd-numbered flights, to equalize wear on the units. A third, standby inverter is available for emergencies.

The relocation and implementation of these instruments involved some wiring changes. While in the process, TCA engineers found that some of the Freighters' wiring did not come up to



PLenty of room inside. Freighters hold up to 36 passengers (left) or 13,000 cu ft of cargo (center). Below: the outer tower (right).



the standard TCA hot set for air passenger service.

TCA engineers studied flight that these first freighters with an aircraft designer to come up with a range of freight. Nonetheless, the carrier decided to revise the Type 170s in accordance with Trans-Canada's standard practice.

An example of wrong practice that was not up to TCA's standard. Bass was heavier through relatively sharp-edged lighting holes without shielding protection between wires and heat shield.

The Freighters' main toggle switches posed a problem. British practice is the reverse of U.S. and Canadian carrier British use the "up" position for "off" and the "down" position for "on." At first, TCA thought it would simply reverse the toggle switch position, but that made the identification confusing since the switches read "up" down-to-down panels near roads.

► **Aero-selective pitch controlling.** Standard equipment on the Freighters was variable propeller pitch controlling—comparable to auto prop functioning in the U.S., except that blades go to only within a few degrees of the full-thrust position.

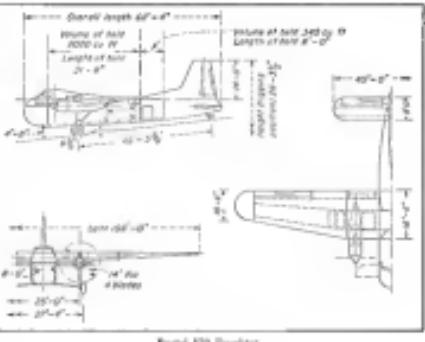
But TCA did not want auto pitch controlling, because it did not need the added performance this feature provides. So TCA asked Bristol for what this termed "auto selective pitch controlling."

Here is how it works. Systems use the same pitch differential system using trim tabs. There are two pitch tabs on each wing, one outside the propeller wash, near the wingtip, the other just outboard of the engine nacelle, inside the prop wash. If an engine loses power, the prop wash produced by its prop diminishes. When this loss amounts to 70 percent of the moment was created at

idle power, the differential pressure between the two pitch tabs on that wing causes the auto selective pitch system to increase the power of the affected engine. It turns the tabs and holds a bulb on the outermost panel above that engine's nacelle telling the pilot which engine is apparently losing power.

The pilot checks the instruments of the engine in question (tachometer, manifold pressure, fuel pressure, etc.) and also judges by the feel in his control pedals, to see if the engine is really losing power or if the malfunction is elsewhere.

If there is a bona fide power loss, he pushes a single prop blade control button on the left of the control wheel and the prop blades close and replace a 200,000-lb thrust limiters automatically.



Bristol 170 Freighters

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TENSIOMETER



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STANDARD-SIZE CAR probe or snap tested by the Aircraft Autotension division of Standard Autotension Corp. This is definitely not only a general purpose instrument, but standardizes the heater wires so that to be installed in the 15 Vacuums. Vacuums TCA will measure later. Only difference is in the fuel discharge nozzle. In the Vacuums it will be designed to discharge IP-4 jet fuel and in the British 100/160 octane gasoline.

The installation also includes thermal feature which operates continuously instead of cycling on and off at 1000 U.S. settings, a controllable temperature snap tension element positions a cutting valve which blocks the control temperature of outside cold air and heater air to provide readings at the normal temperature of 100° F. and a damping element through a special damping device.

The system also includes a flexible air duct to connect the disengaged heater to the probe held heater ducts when the nose doors are open to heat or cool the probe. Thus, heat only is distributed during the whole loading or unloading operation to protect perishable cargo and keep cargo handles warm.

• Fuselage protection. Trans-Canada got forced to install fuselage protection plates to shield the plane's body from ice and rocks which the propa might sling into it's sides during ground operations.

• Propeller protection. Trans-Canada is equipped with the TKS system to protect the center of the propeller from the forward foliage and the pilot's side of the cockpit. Small holes in the center of the propeller are filled with holes in the rear drag up as soon as the airplane starts to move to protect the propeller.

This causes differential pressure change to allow the propeller to move and a light in front of the propeller, lighting a red light when the propeller is moving. He can turn on the TKS with anti-swing system, the propeller anti-swing system which uses the same fluid as the wing or the windshield system which uses a shock absorber.

• Antiicing system. Freighters are equipped with the TKS antiicing system. The system pump Aca Steel Company #2 softening fluid freshly filtered with glycol added for freezing qualities through porous metal strips mounted in the leading edge of the aircraft. System includes 55-gal softening fluid supply tank, two electric motor-driven pump mounted in gear

shed, and nine distributor lines which supply main porous distributor lines which are located on the leading edge of each wing, one each in the horizontal stabilizer, and one in the vertical fin.

The 94 gallons of deicing fluid is sufficient for three hours of continuous operation. TCA pressure cells for top going off the supply lines at every stop during winter flying.

Under normal conditions, only one pump operates at a time, the other sitting as a stand-by unit.

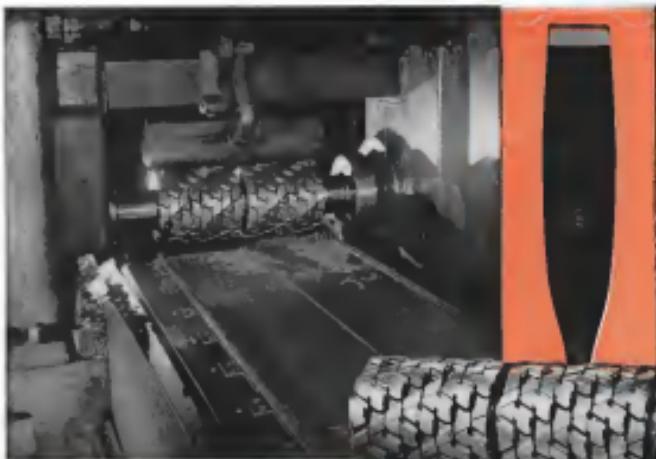
Prints say that the system works effectively as a device as well as an indicator. They report cases where the system would prevent damage which had already occurred in the wing.

They also say that the TKS system is turned on for a short while during load approach, load, and top load over top surfaces of the wing and stabilizers. This makes it easy to remove any snow or ice which might accumulate while planes are on the ground.

• Wheel diameter. The Freighters is equipped with an anti-skid system. A small unit must prevent from the forward foliage and the pilot's side of the cockpit. Small holes in the center of the propeller are filled with holes in the rear drag up as soon as the airplane starts to move to protect the propeller.

This causes differential pressure change to allow the propeller to move and a light in front of the propeller, lighting a red light when the propeller is moving. He can turn on the TKS with anti-swing system, the propeller anti-swing system which uses the same fluid as the wing or the windshield system which uses a shock absorber.

• Pneumatic system. TCA engineers are past the Freighters' pneumatic system has been trouble-free in use. Two fly



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static compression, one mounted on each engine, supply air compressed to 450 ft. to the rotors.

Two small "sheller tubes," one for each compressor, keep moisture out of the system. Whirling tubes are small venturi's in the compressor outlet line which suck in small amounts of moist air for the purpose of acting as an anti-freeze for the air going into the pneumatic system.

The pneumatically operated wing-flap actuator, made by Deltapac, operates in 1900 rpm. In the first part of the nose landing gear, the wings drop to the center position (10%) position, the center pair moves out to a stationary position. To go to the full landing (30%) position, a movable plates within the pitch cylinder is converted to a conventional piston-cylinder rod relationship. Flaps lock themselves only in the full-down position by a cam overriding center.

As pressure to brakes is increased to a maximum of 150 lbs. Two gages on the pilot's instrument panel show pressure going to each brake at all times. It is standard procedure for pilot to final approach to depress both pedals fully. This causes both such basic as getting off full 150 lbs. That he knows whether he will have full brakes when he touches down. If anything is wrong in the brake system, he is free-

wheeled and can take emergency corrective action.

• **Landing gear:** Main and tailwheel landing gear are made by Dowty and use the "liquid-spring" principle (Aeronautics Week Mar. 23, 1951, p. 60). In the liquid-spring strut, all shock absorption is taken up by fluid instead of the fluid and air combination used in conventional strut units.

TCA has it experienced a bit of trouble with the gear as extremely cold weather because of the very small amount of fluid in the system (the fluid wheel strut fluid capacity is 0.5 qt.). Cooling of the strut itself amount of fluid during freezing temperatures causes strut partially to collapse.

Testing in the Freightier prior to taking off and after landing gave the impression that the strut was somewhat more sprung than Aerials—they give a place a pleasant, easy movement on the ground.

Inside the Freightier

The flight in the Freightier brought out several points.

The plane took off easily at a gross weight of 40,000 lbs. at an indicated airspeed of 110 mph. Power settings were 2,880 rpm and 9.5:1 Ig maximum field pressure. Climbed easily to 14,000 ft. with power settings of 2,400 rpm and 4.5 Ig. Cruise speed was 160 mph.

In spite of complete Fibreglas sound proofing which TCA had installed in the tail and "tubs" in the rear of the plane, the flight was very noisy. The plane was well balanced and stable, in spite of cold weather and some bumps in.

Cockpit is quite enclosed, has low ceiling, making getting into or out of the pilot's seat a difficult position awkward. When seated, there is little head clearance. As a result, one must use the cockpit in relatively comfortable. Access to the cockpit is via a small metal ladder and a hatch in the cockpit's floor. Visibility is good. • **Pilot's Viewpoint:** The cockpit had these dimensions to work in the flight progressed. "The aircraft is very stable." There is little difference in its handling characteristics whether heavily or lightly loaded. Under the former condition, the tail is a little heavier. — In case of engine failure, the plane's tendency to yaw is quite small and resultant roll is quite light. The pneumatic system would fail, brakes are normal, don't grab and are free from contamination. — At 250,000 ft. from the center may be diverted to the cockpit through a doorway if necessary.

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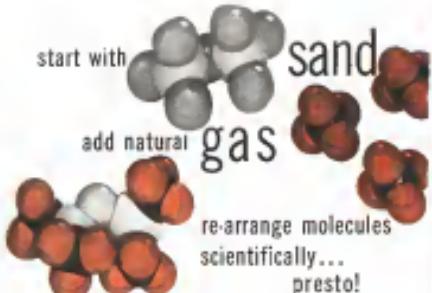
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• **Avrojet Spansons**—These are the
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• **Fire protection**—When a fire warning occurs, a light shows up in the leather bottom of the ejection seat. This actuates the pump but also drops the contents of a 6 lb. bottle of methyl bromide down the carburetor and intake. This may prevent discharge another 6 lb. bottle of the emergency system and a 12 lb. bottle through the center fire ring located between the engine's two rods of cylinders.

• **Boosts in action**—Two servo switches, set to operate at 6G, are mounted in the belly of the aircraft. When the aircraft is directly contacted in such a way that failure of one does not tap the system, the switches automatically discharge all the surplus hydraulic bottles contained above. In addition they disconnect the outer electrical system from the main bus.

Exception is the emergency bus, which supplies power to manage the usually suspended fire extinguishing system, one radio transmitter and one receiver, cockpit and navigation lights, and the emergency power source on the left side of the instrument panel. The emergency bus, which cannot be supplied by the plane's batteries, is completely independent of the Fighter's normal electrical system.

• **Fire distribution**—Hot air from the boosters is fed into a duct mounted on top left side of the cargo hold. A special duct connects hot air to the cockpit. Airflow is controlled by the pilot through a damper.

In the hold, eight risers with individually controlled dampers bring the air from the main duct to floor level. Two other blowers will bring air to the instant blowers behind the rear cargo compartment and the auxiliary at the tail of the aircraft.

TCA officials say that various walls are being made to shield off particular compartments so that their heat may be independently controlled.

These temperature-suspending walls, located in the forward and center sections of the hold and in the lobby, tilt the pilot on a single instrument the heating conditions in these three sections of the plane.

TCA & Freight

The British 170 was conceived from the beginning as a freight aircraft and every possible consideration was given to making it as functional and utilitarian as possible. As a result, the plane has outstanding advantages in TCA's opinion, compared to our (such as the North Star) built primarily as a

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For example, a comparison of the TLN-10 jet ignition system, produced by the Bendix Division of the Bultaco, with earlier designs shows significant improvements in every operating characteristic—well at the same time original cost, operating expense and weight are substantially reduced.

Here, indeed, is the Bendix TLN-10 jet ignition system, in a classic example of how the greatest natural profit of greater value for the taxpayer's dollar is being put into practice.

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Bodies for aircraft.

• Higher settings available at better plus—improved
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elimination of plug fueling difficulties.

• The TLN uses low settings only and eliminates problems
associated with pre-ignition and severe self-ignition, such as detonation losses, vibration, representation heating, and fuel surge.

• Superior start—faster—longer—lower cost
without excessively high temperatures. TLN-10
system is engine mounted whereas TLN-1 is in both
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EASY
DESIGN
WEIGHT 7.165

Winnipeg, 500.10 (distance is over 900 miles and expenses to corresponding rail express rate of \$8.98). Montreal-Pt. William, \$8.98 (a distance of roughly 790 miles, rail express for a \$7.50).

So, when the considerable increase in speed of transportation shipments is compared to the relatively slight increase in shipping charges, TCA is confident that it is sound, bolstered by the feasibility of the Bristol Freightliner fleet, will put wide expansion in the coming year.

Lightweight Battery Starts Turboprops

McGraw-Hill World News

Stockholm—A new Swedish aircraft battery has been developed which reportedly will start flying aircraft engines without aid of an outside electrical source.

The battery is said to weigh half as much as conventional lead batteries, is spill-proof and practically unaffected by cold. Produced by the British Battery Co., and based on a British invention, the battery reportedly has been tested successfully in cold-weather operations on the Victoria Viceroy. Vickers and Rolls-Royce cooperated in the trials, as did the Canadian government.



Safe Work Ladder

All metal stirrups developed by Lakeland Metals Inc's New York base is safe and recommended, LAS report. Based on a survey test using 24 batches, LAS estimates it will use 57,500 over a five-year period by using these replaceable ones instead of bypass previously and replaceable batches. Strength and replacement costs at LAS's Edgewood base in the one-year test add up to more than 70% of the total cost and of the new batches. During the year and a half, a single accident due to broken stirrups was reported.



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24 324

ILLUMINATED TAXIWAY sign is clearly visible to trumpet as it leads to runway

Taxi Guidelights Aid Pilots, Tower

Illuminated runway guidance signs recently installed at General Airlines Airport have passed final test and are serving the Cleveland field. This will be the first such complete installation on a commercial air field, at least in that country. First reception of the lights is reported to be excellent.

Principal advantage of the 55 signs installed at Pittsburgh is that they allow pilots who are unfamiliar with the location of runways, taxiways, ramps, service areas, etc., to find their way around easily by following the signs instead of trying to memorize complex instructions from the control tower. This reduces inconvenience between pilots and tower and gives both more time to concentrate on other activities.

► Follow the Signs.—With the signs, the control tower operator simply tells the pilot what runway he is cleared to, wind direction, gear, shoulder setting, followed with such advice as "... Use tower signal to your right and follow the signs." Only other requirement is for pilot to get clearance to cross active runways or take off.

The signs have completely eliminated a situation which used to arise occasionally when pilots getting lost, particularly in bad weather.

Another advantage is that pilots can see signs from a distance of 500 ft. therefore can taxi at steady ground speeds of about 35 mph without fear of overrunning a taxiway or having to slow down to make sure they are on the right path. This makes ground operation easier on pilot and plane and expedites ground traffic. During Pittsburgh Airport's nine hours the 55 signs have had only one pilot either land and take off at a rate of one a minute.

Manufactured by the Crown-Hicks Co., of Syracuse, N. Y., the signs are made of aluminum and contain from one to six interchangeable letters which can be rotated from either end. The letters, numbers or symbols are made

of an orange-yellow translucent plastic on a black background. Dimensions are panel 12 in. x 12 in., 6 ft. 6 in. long, 1 ft. 6 in. wide, 15 in. high, 120 lb.

► Bendable Coupling.—The signs are mounted at all runway and runway intersections and other strategic points. They serve for both on- and off-airport traffic, since both air and ground traffic are oriented on bendable couplings at heights varying from 30 to 10 ft. above the ground.

When navigating runways, the runway markers are so arranged that they identify both ends of the runway for the pilot. For instance, if he sees "33/14," he knows that, because the 32 shows up to the left of the 33, the 13 and 14 are to the right of the 33 and 14 to the right.

Some of the abbreviations used with the sign are: "VSTR" for distance markers; "MLL" for areas set aside for military planes; "CRCC" for areas for cargo aircraft; and "HGR" for hangar areas.

The signs can be installed on existing Gossen-Hicks type ERK, too light to be used if they are properly located, according to the manufacturer.

Unusual Suspension Mount Controls Vibration Shock

A new mechanical suspension system of unusual design controls vibration and shock that might damage delicate avionics equipment. It can be used for the separation of missiles, jet engines and other large units, as well as for the mounting of avionics equipment in aircraft.

The new mount has six springs, acting in different planes of freedom and passing rigidly on an outer ring. Application of load causes an unequal deflection in each spring, giving each a different period of vibration. This interaction prevents the resonant buildup

of amplitude which occurs in other spring-mounted assemblies, thus helping to protect the load, say in dragons, Ray Applegate of Mechanical Suspension Mount Co., Ltd.

The period of vibration in any part of the assembly will always differ with deflection. This is due. Applegate points out, to the use of constant outer compression springs and inner tension springs with non-uniform coil spacing and varying coil diameter. The inner springs prevent the outer and inner coils as a function.

Applegate says that he means his patent commercial performance, an investment and maintenance costs. It has shown excellent ability to absorb impact loadings.

A Douglas customer requesting the mount and built to comply with Specification XAE-64 requirements for light weight, shock and loadings, performance, and easy removal when required, has been using the vibration and drop test for about a year. It withstood more temperature tests with no deleterious effect at the extremes. Concourse ratings failed and had to be redesigned because brittle, but the springs in the mount were unaffected and the unit is still good as new, Applegate claims. Production costs are still well less than 30 lb., the designer says.

Since the mount is a complete assembly in itself, it can be used as a handling dock on a shipping or storage unit, with or without the aircraft.

McDonnell-Swanson Mount Co., Ltd., 110 State St., Westbury, L. I.,

Rugged Pressure Gage

Omits Linkages, Springs

Extreme ruggedness and high accuracy are claimed for a new type of pressure gage, now reported in standard with a number of aircraft and missile manufacturers.

In these gages, the indication is obtained directly to the closed end of the tube, or Bourdon cell, instead of having to use the flexible tube through linkages, multiplying gears, hair springs, etc., as in most conventional gages.

The indication may be seen over a range of 100 to 10,000 psi, with a resolution of 100 psi, and 5% vibration tests at 100 to 1000 cps. Range can from 0 to 100 psi and 0 to 60,000 psi. The gages will withstand a 100% graduation range without any damage. They are hermetically sealed, and resistant to oil vapor and fumes.

The new gages come in a variety of dial sizes, range and capacity ranges, to be panel or low-profiled, with MF or NC (resistor) connection, and with side or rear entries. Some units have a

Stiletto-shaped twin jet

joins Douglas family of



Stiletto—world record holder in '52 at 1,027 mph, 52,000 feet altitude



high-speed research aircraft

—the supersonic Douglas X-3

Now to the record-breaking Skystreak, the Douglas Skystreak and the record-breaking carrier-based Skywarrior, add this important experimental plane—the Douglas X-3.

Performance is secret, but a little can be told. Larger, heavier than a

DC-3 transport, X-3 flies on wings smaller than a DC-3 and—using conventional jet engines for sustained flight, X-3 has already demonstrated basic features on acceleration, reacceleration, and the use of heat-resistant aviation, while its payload of research instru-

ments has been used to study the stresses and strains of flight in supersonic speeds.

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Rate Ruling Hints of CAB Offset Policy

- First indication is given in Atlantic subsidy case.
- Court decision holds up final PAA, TWA pay.

By Frank Shek, Jr.

First hints of how Civil Aeronautics Board will apply the Supreme Court offset ruling (AVIATION WEEK Feb. 1, p. 13) were brought to light last week as Eugene R. Vesses, Radcliffe, attacked the postal subsidy in the trans-Atlantic first class air mail, reviving Pan American World Airways, Trans World Airlines and the no-longer-existent American Overseas Airlines.

If Radcliffe's conclusions stick, CAB will take action to obtain evidence for determining mail pay needs of an airline, based on its income operations as reported by the event, using "fair and reasonable compensation" as the offset against mail revenues for other operations, the court has held. This is considered particularly suitable to airlines with combined domestic/international operations (AVIATION WEEK Feb. 15, p. 87).

► **Transwest Solution**—Citing CAB's findings in complying with the offset decision, Radcliffe offered the following temporary conclusions on trans-Atlantic mail pay:

- TWA's fair and reasonable compensation for transportation of mail over its international routes from Feb. 1, 1946, to Dec. 31, 1952, is \$54,093,300.
- Pan American's mail pay for Atlantic Division routes from Feb. 1, 1946, to Dec. 31, 1952, is \$71,089,890.
- TWA's mail pay for operations over its present routes, or any routes that may be authorized in the future, will be computed by the following formula: For each calendar month on and after Jan. 1, 1953, an effective rate per designated route flown, obtained by dividing designated route flown during the month into the product of 1.12 cents times the lower of 1,765,671 times the number of days in the month or the standard available seat-mile flown in scheduled passenger service during the month.

- Computation of PAA's mail rate for operations of future authorized routes from Jan. 1, 1953, will be accomplished in the same manner as TWA's, but designating route flown during the month will be divided into the product of 1.12 cents times the lower of 1,341,585

New Domestic Airmail Rate Structure

A reorganization of the mail structure of the nation's 13 domestic truck routes is under way.

Civil Aeronautics Board has alerted the airlines and the Postmaster General to submit statements before April 23 proposing:

- New service mail rates, which each airline will be free.
- Methods for determination of apportionment of earnings for mail and air mail packages.

CAB aims to devise a uniform rate structure that will be simple, fair and reasonable for the airlines and available to all parties. It has established the mail class effective April 1.

Included in the routes are Alaska, Alaska, Far East, Trans World, United, British, Delta, CA&S, Northwest, Orient, Capital, National, Western, Continental, Northwest and Central Airlines.

► **Investigation Rulz**—A Board order last December ordering an investigation into the route picture has not produced the desired results. Data collected from the airlines has not been sufficient to resolve the problem of standardization or regulation.

From the number of days in the month or the standard available seat-mile flown in scheduled passenger service, and availability, "fair and reasonable" are the ingredients of the division, with fair rates to divisions made to extremes. The more buses, the smaller and briefer do not exclude the practice of fixed rates for TWA and PAA in these districts for the period involved.

The case has been transferred into one of "icing," "fleeting," rates for the trans-Atlantic operations of these carriers, the examiner reported.

He said that before a final rate for each of these routes can be set, further jockeying will be necessary to meet the requirements of operations of other divisions to determine the need of each route as a trans-Atlantic mail carrier.

Prior to the court ruling, the case had pended on the basis that it concerned the setting of fair and reasonable rates for TWA and PAA for their trans-Atlantic services alone. Previously established "fair" rates for other divisions of these carriers were taken as fixed, subject only to the rate of possible offset of excess earnings.

tion of analogies on the Board had anticipated. That is fundamental to any uniform service mail rate structure, CAB says.

The Post Office Department did not supply the Board with any statement of its views on the matter. It is the Post Office's policy to give mail contracts to the airline with the lowest bid and rate that has prompted the current investigation. Such a policy would tend to support mail rate structure, CAB believes.

► **Reorganization**—Post Office, concerned with keeping within limit of limitations, is interested only in doing business with operators charging the lowest rates. These are the "big four" airlines, whose total rates in 45 cents a ton.

By reorganizing the rates now, the Board believes it will be the general work for reorganization of final service and rates for the 13 carriers involved in an appropriate uniform rate structure.

When a new rate structure is established in the coming months following the current study, mail rates will be retroactive to April 1.

► **Upon Panama**—But the offset decision certainly goes beyond Panama and mail. "The Board cannot ignore the foreigner of the division, sit fair rates to divisions made to extremes. The more buses, the smaller and briefer do not exclude the practice of fixed rates for TWA and PAA in these districts for the period involved."

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He said that before a final rate for each of these routes can be set, further jockeying will be necessary to meet the requirements of operations of other divisions to determine the need of each route as a trans-Atlantic mail carrier.

In view of these facts, Radcliffe concluded that this postal trans-Atlantic division could not meet the requirements of the offset ruling. As a result, he did not rule out in the case of TWA.

► **Possible Implications**—The examiner did, however, include his own views as to possible impact of the court ruling upon the two airlines.

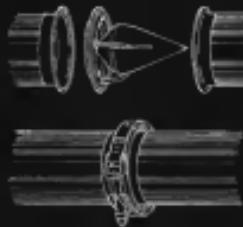
He and Post Office holds TWA had



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reduced excess domestic earnings of \$13,158,000 for 1951 and 1952 that should be used to offset extra cost for international operations. Post Office also contends that Pan American had excess earnings of \$53,350,000 for 1951-52 in its Pacific-Mexico Division.

Rudolphi believes, however, that during the other years of the review period also should be heavily reduced. He pointed out, for example, that from 1948 to 1952, TWA had an excess earnings deficit of \$1.4 million or an excessive earnings which PAA had to use of \$1.2 million.

TWA Rate. With respect to TWA, the committee found that TWA's International Division rate is equal to 1946 to the present, while the carrier's domestic rate has been pronounced closed for the entire past period since the Big Four mail rate decision in September 1951.

But the offset decision also requires that TWA domestic profits in 1951 and 1952, and thereafter, be reduced in determining the level of the subsidy for these years. Since there is no discernible difference in the rates of TWA's domestic rate for 1946 and 1952, it follows that the domestic losses of 1946 must also be considered in determining its need in excess of that year.

PAA Earnings. In the case of Pan American, Rudolphi reported, "There would appear to be no question of excess earnings for a division and period for which a rate has been set on the basis of a past period review. Prospective 'final' rates have been set for PAA's Latin American Division between Jan. 1, 1946, and April 6, 1945, and for the calendar year 1951, for the Pacific Division, for calendar years 1951 and 1952, for the Asia Division, for the last half of 1951 and all of 1952.

Considering these PAA earnings and prospective TWA mail awards falling within the past period for this proceeding, it cannot be found that PAA had excess earnings to reduce the need otherwise found proper for the 1946-1947 period.

The committee said the Post Office is holding that PAA's Pacific-Mexico Division's earnings were in excess of a 10% return on investment for 1951 and 1952, failed to consider that as the basis of indicated results for the carrier's Latin American Division from 1948 through April 6, 1948, "PAA could not possibly be net earnings for that period a half-year earlier."

No Errors. On the basis of these arguments, Rudolphi concluded that neither airline rendered any net excess earnings during the past period to be applied at all other services in determining need in International and intra-

domestic flight.

ATA Joins Pilot-Engineer Hassle

An Transp. Assn. has extended the dialogue between pilots and flight engineers of four-engine aircraft over interpretation of proposed amendments to Civil Av. Regulation 184000 (Aviation Week Mar. 21, p. 72).

ATA has offered to give Civil Aviation Board further clarifying amendment to those under consideration and has asked for an extension of their effective date from April 1 to July 1.

CAB has been denied ATA's petition that was expected to initiate the rest of the new proposed regulations to the cockpit door and cockpit entry.

Problem of Views. Both parties are in agreement on a variety of interpretations of the amendments as in the role of the pilot. It will not be solved by interpretation either by the Board or Civil Aviation Administration, ATA claims.

"No regulation which is so important in these and because of this importance can be subject to differing opinions and disputes can be caused by interpretation," the association says.

The regulation should be written clearly so that interpretations are not

CAB View. The Board has "approved the amendments as presented" in conferring on the pilot an increased role with respect to matters concerning the operation of the airplane, full control and authority without limitation over all other crew members and their duties during flight time, whether or not he holds a valid certificate authorizing him to perform the duties and functions of both other crew members.

CAB says it "finds no reason at the time of the presentation of proposed regulations to the cockpit door and cockpit entry that the pilot's role in operating the airplane is congruous with what he does not hold a flight engineer's certificate."

One Consensus. Eastern Air Lines pilots filed a petition with the Board last month to have the amendments changed so there would be no possibility of doubt that the pilot is as important as the captain. Use of the proposed interpretation would permit pilots and ATA to feel "restraint in the pilot's command of the airplane in emergency situations if he does not hold a flight engineer's certificate."

ATA division 41, safety in the cockpit, as it is implied, says ATA would be extremely anxious to have a safety supervisor. Only one person can be in command of an airplane, ATA states CAB agrees.

The aircraft commander normally should not be placed in a difficult position with regard to the function of an aircraft captain, because he does not have a special certificate such as a flight engineer's certificate or flight engineer certificate, says ATA. "It is clear that the airlines have given the flight engineer as flight crew only those which an aircraft pilot can handle a flight engineer certificate, has handled a special certificate, or has qualified the pilot's license and qualified on the airplane to occupy the flight engineer's position.

This would not remove the captain from the cockpit but would make clear that the flight engineer's position can be occupied either by a flight engineer or a pilot holding a commercial pilot's license and qualified on the airplane to occupy the flight engineer's position.

The regulation should recognize the desirability of preventing airline management from determining who is to be the flight crew member.

An alternate, says the flight engineer committee or another pilot who is in the opinion of the air carrier, is qualified to perform this function," ATA says.

No Abuse. ATA recommends a provision to the amendment that "check pilots who are approved by the airline and designated by the Civil Aviation Administration as responsible to check the pilot-in-command or the co-pilot also shall right-check any other member of the flight crew."

The present provision "will make me believe every time you report a pilot-in-command (not having a flight engineer certificate) to check him on the cockpit door of a flight engineer to act as a co-pilot," ATA adds.

ATA also recommends "that a flight engineer shall not be assigned to perform duties for which he is required to be certified as a flight engineer unless within the preceding 12 months he has had at least 50 hr. of experience as a flight engineer on the type airplane on which he is to serve or until he has been checked by the air

flight or an airline or to be unqualified."

PAA Argument. Air Line Pilots Assn. argues that the amendment prohibits a pilot, without a flight engineer's certificate, from:

• Taking over the flight engineer's handling of the flight engineer's panel in an emergency.

Flight Engineers. International Air Transport Assn. says the flight engineer's panel is wholly within the pilot's privilege and not subject to the direction of the flight engineer.

This provides an "unfavorable cockpit atmosphere," ATA contends, and it effect "breaks a fence" within the cockpit.

"Airline cannot assume responsibility" for this "which would result in definite and substantial loss in transportation," the airline representation argues.

Certified. North-ATA believes the amendment, as it now stands, would force pilots to obtain flight engineer certificates which would be costly to the airline because of the added responsibilities.

The association recommends an amendment to existing regulations, as follows: "An airline holding a valid commercial pilot's license and qualified on the airplane to occupy the flight engineer's position.

This would not remove the captain from the cockpit but would make clear that the flight engineer's position can be occupied either by a flight engineer or a pilot holding a commercial pilot's certificate.

The regulation should recognize the desirability of preventing airline management from determining who is to be the flight crew member.

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flight or an airline or to be unqualified."

The original amendment made the period six months. Experience has proven that a two year regulation, ATA states, "lead to no real economy the air line does not allow the implementation."

PAA, Eastern, Delta Ask for Mexico Routes

An eight-point committee of the Air Transport Assn. Board has been formed to evaluate two proposals of short distance air navigation—Mexico-BMRE and Tancan (Aviation Week Mar. 7, 1953, p. 40, Feb. 15, p. 24).

Midwest W. Arnold, vice president-airlines, Air Transport Assn., has been appointed chairman. Arnold was sharply critical of the decision by Civil Aviation Administration to complete construction of the 917 DME system (Aviation Week Feb. 22, p. 18).

"It is extremely difficult for us as members of the industry to see why the CAB is going to stand about and wait for the completion of DME when there is no original operational program, no original operational program for the DME," Arnold said at that time.

Industry Emphasized. Last announcement of the new committee was made by Undersecretary of Commerce Robert Murray and Assistant Defense Secretary Donald A. Quarles. The announcement said: "The appointment of Mr. Arnold is chairman emphasizes the extent to which industry is being brought into this problem."

Other members of committee: E. C. Wood, Defense Department representative; ANDB, Peter Chapanis, chief, Airways and Navigation Division; Col. L. W. White, director, Civil Service Selection Laboratories, P. O. Monroeville, N. H.; H. J. Reddish, assistant to the head, Air Navigation and Air Traffic, Flight Services Division, Office of Naval Operations; Col. H. A. French, director, Electronic Systems Division, USMC; Col. Monroe, chairman of the board, National Research Aircraft Assn.; and J. B. Houghton, president, American General and Fabric Assn.

Bureau. Dec. 30—The committee has been cleared to make its final report July 30. Preliminary findings are under way. The first report will be submitted to the secretary of defense for last week. Military departments are awaiting final defense recommendations and Air Guidance Committee is reviewing committee defense recommendations. That study will be made available to the committee by May 1. The military departments are evaluating the latest VOR/DME equipment and Commerce Department is evaluating the Tancan system on which he is to serve or until he has been checked by the air

ment and Evaluation Center at Indianapolis, Ind. The evaluations are to be completed by July 1.

ANDB Team Studies DME, Tancan Dispute

An eight-point committee of the Air Transport Assn. Board has been asked by three more airlines that own American Airlines as what probably will be a combined Mexico City route.

Pan American World Airways, Eastern Air Lines and Delta & Dixie Airlines and Civil Aviation Board approved to be the realistic route. The American can expand direct nonstop service from New York, as does Eastern. At present, Pan American flies between Mexico City and Phoenix, Tex.

Delta & Dixie joined with PAA in a joint petition for an interchange agreement in providing service between Chicago and Mexico City.

Negotiations. Douglas-Deppen-Aeromexico are awaiting results of court action on its New York-Mexico City nonstop proposal (Aviation Week Feb. 22, p. 17).

Pan American and Eastern are also concerned but February is obtaining legal action to prohibit American from beginning the Mexico service under an exemption granted by CAB. Meanwhile, American has ended unsuccessful negotiations with Mexico to obtain its services of its nonstop service. The Mexican government has notified AA that it would permit operation by the airline only on condition that a Mexican-circling circuit be granted a route to the U.S.

That takes the route out of the hands of the airline and gives it back to the State Department, only agency which can do so. Interrelated agreements with some foreign governments are involved.

Since no bilateral peace exists between the U.S. and Mexico, State Department gave American only limited authority to discuss the airline's proposed route rights right.

Equal Terms. Pan American and Eastern want to complete for the Mexican market as equal terms with American and foreign airlines, with an Air France, which recently began Pan American-Mexico City service.

PAA, Delta, Pan and Work Group called an interagency meeting to discuss its current service. In the past, Pan American has worked as part of a triagency agreement with Eastern that would permit through service of the routes of the two nonstop between Mexico City and New York.

EM, assistant, has declined.

On the PAA-Delta interchange petition, the airlines are seeking service over Delta's route from Chicago to St. Louis continuing over Pan Am's route from Houston to Mexico City.



New Air Terminal for Honolulu

ATA's assumption of new 344,000 sq. ft. modern facilities planned for Honolulu International Airport. The strip contains the lead and six terminal new building both sides of the airport and will more than double present overall capacity while serving intra-island and overseas flights. Infrastruc-

Hopes for Balboa Decision Fade

CAB defers ruling on case, proposes new independent airline to operate through service to South America.

Civil Accountants Board again has deferred decision on proposed New York-Baltic through service and new measures towards establishment of a single independent referee to serve the role, publishing final statement of the three-year-old case further into the future.

The proceeding, involving through service between U.S. and certain South American points by means of an equipment interchange, concerns Pan American World Airways, W. R. Grace & Co., Pan American-Coca Airways, Braniff International Airways, Eastern Air Lines, and American-Andean.

Anti-Lines, and National Airlines
Pro-Competition *Rentia*—CAIT's latest action gives the airlines 60 days to submit plans for establishment of an independent operator between Houston and Miami, on the one hand, and partners served on the combined transnational routes of Braniff and Pan Am.

The Board says construction of such an agoroute would establish two effectively competitive routes:

- Paraguayan and Brazil's combined routes, operating primarily on the west coast of South America.
- Pan American's routes on the east

It preserved with an agreement involving such an interisland airline, the Board said it also would consider promptly equipment interchange proposals that would provide access to the northfronth U.S. for the new carrier and thus eliminate the need to land from Balboa, C. Z., and South America.

New Delhi—CAB's deferred decision affects various proposals involving programs of airservice between northfronth U.S. and Balboa and the west coast of South America, as well as service to various points in the Caribbean area.

Voluntary proposals had been submitted for interchange of components between PAA, Panays and Eastern, and the Board had placed under negotiation arrangements that would include National and Braniff. The proposals with respect to Braniff involve extension of that airline's route from El Centro to Mexico for interchange purposes.

Reopened Record—A previous Board decision against Pan American and TAI was rejected by President Eisenhower last May, with a request that the record be brought up to date. CAS complied, reopened the record, and hearings were held before an Examiner. Late last year additional oral arguments were held.

Since these end arguments, we'll

period by May 8, returning full operation four months after the Series I lines were grounded by a ROMAC earth near Elba (see Fig. 11).

The airline also plans to inaugurate a new Comet service from London to Nairobi during the first week of June.

► **First Taken!**—First of BOAC's fleet of seven Conairs (see Boxes 14) and one 140 to resume scheduled service took off May 23 from London for Johannesburg with more than 90 modifications designed to cope with possible cases of air-sea rescue crashes. (Associated Press)

The dc Handley-built transports also will be put back on the route from London to Colombo, Ceylon, Apr. 7, London-Singapore May 3 and London-Tokyo May 5.

The British airline followed the lead of Union Aeropostale de Tunisie, Tunisair's carrier that put its two Concorde back into service May 15. Air France is scheduled to resume Concorde

operations Area 11.

► **Chaos**: Fossils—Meanwhile, scientists here are examining three de Haanland Chert outcrops recovered from the wreckage of the ROMAC Comet that plunged into the Mediterranean off Elba last 10.

The fourth engine, divided from the bottom of the sea, also will be examined here.

► Missing Turbine—Turbine section was missing from the third engine recovered from the crash, but authorities continue to hold that the shaft probably was broken by collision impact. General belief discounts the theory of disintegration of the turbine around the shaft. Public inquiry still undecided, may now otherwise. De Havilland metal lengths will testify at the hearing on this finding, as current checks of the Comet 1 and its powerplants.

SHORTLINES

► Northwest Orient Airlines reports heavy increases in passenger loads and revenues on Honolulu flights since inauguration of DC-880 tourist service. Compared to last year's December-January-February quarter, passenger loads are up 19.3% and revenues 14.2% higher.

► Chikmag (Calif.) Municipal Airport reports takeoffs and landings totaled 100,184 last year, compared with 103,119 during 1952.

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EDITORIAL

Hydrogen Bombs & the Airplane

To quote the warlike Deputy Commander of the world-wide U.S. Air Transport Command, Gen. C. R. Smith, it is not necessary to be a student of military strategy to realize from the current hydrogen-bomb tests that something tremendous is going on.

Recent reports American War has received from high military and political circles point up one outstanding fact: The more powerful the weapon, the more vital necessary it becomes for us to have super-speed, long-end-carrying aircraft ready to attack the aggressor's homeland.

Much of the current debate over the so-called "new look" military policy ignores this point.

Gen. Smith, both before his military service and since, has been president of American Airlines. He recently described the current military changes as the revolutionary beginning of a concept of national defense that is more suitable to the American technical genius and to the new set of strategic conditions dictated by man's destruction weapons that can strike "desolately, directly at, beyond, and over deployed military forces of the traditional variety." And he has done it better than anyone else in civilian aviation whose comments we have seen.

Even the atom or fission-type bomb was so powerful that a new word was invented to measure the energy it released—the kiloton, corresponding to 1,000 tons of TNT. Now comes the thermonuclear weapon that requires another power order of measurement: the megaton—measuring the energy equal to a million tons of TNT. The average explosive power of the Nagasaki and Hiroshima weapons was about 20 kilotons. The 1952 hydrogen explosion has been estimated at four megatons or equal to 4 million tons of high explosive.

"THIS IS EQUIVALENT IN DESTRUCTIVE CAPACITY TO ONE MILLION BOMBERS OF THE WORLD WAR II VARIETY," GEN. SMITH POINTED OUT. "EVERY TRANSPORTING TONS OF TNT."

If we and I were to stand out in the open, watching one million bombers passing overhead, at the rate of 100 each minute, we would be on our feet for 166 hours, or nearly a whole week, before the last of the billions passed overhead. That is the meaning of the power of a single thermonuclear weapon—a small one.

Some published reports estimate the power of the Min. 1 bomb as "equivalent of 14 megatons" and that of the biggest of the current series, yet to be exploded at about 40 megatons, or equal to 30 million World War II bombers.

This revolution in weapons has centered upon the bomber, a potential destruction as vast as to make the effective power of traditional weapons (the submarine, the battleship, all the surface arm of war) seem almost insignificant by comparison. C. R. Smith emphasizes:

Demise seems in another war would probably be

laughed and settled in a few months or even weeks, he believes.

"The telescoping of the time element seems to me to teach just another lesson," he says. "It is that the destructive war battle in a future war would be fought to conclusion long before the traditional surface forces, except those already in position near the enemy's border, could be brought into action in sufficient scale to affect the outcome."

This means that the idea of maintaining a huge land army, to be deployed overseas in event of war, seems to have less and less relevance to the new facts of military power as we are coming to understand them. It also would seem to mean that one of the principal missions of the Navy—to transport and support an overseas army—would drop down the list of national priorities.

It probably would mean, too, that the part of the Air Force primarily concerned for supporting the Army in the field would come to have a huge claim upon national interests.

"These factors," Smith says, "appear at least to have been given due weight in the new military budget. The recent statements of Adm. Radford reflect the view that basic strategy should be changed, and that force levels should be changed accordingly. President Eisenhower has supported the trend toward a new weapon concept, saying further that the development of these new weapons creates new relationships between men and materials. These new relationships permit economies in the use of men as we build forces suited to our situation in the world today."

Thus C. R. Smith believes we are seeing the beginning of a new national strategy, based on weapons systems in which our margin of technical advantage is greatest. If that trend continues and the new idea as given them just play with a cutting away of those elements not needed in support of the new strategy we should be able to anticipate a national defense budget within our ability to pay the bill.

It should produce, he says, an actual gain in global military capability and, in due course, a substantial reduction in federal taxes, adding:

"The one thing that seems certain is that the power to subdue instantaneously and completely is the surest deterrent upon aggression."

"So long as that military power is preserved in sleepless vigilance, benefiting constantly from the highest technical creation and so dispersed that a small never be overwhelmed or destroyed in a single attack, the peace of the world will be reasonably safe."

"There is no escaping the conclusion being forced upon us. It is that the deterrent force represented by atomic weapons and the capacity to deliver them through the air is also the only sort war-winning force. Science has doomed the old way."

Never has the airplane been such a vital military requirement as it is today. —Robert H. Wood

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Rocket firing jets reach new heights

Air Force and Allison engineers have put their heads together to save the taxpayers' money and get higher-altitude performance from veteran Northrop F-89 Scorpions. They developed a field modification kit which gives the earlier Allison J35 models the performance of the latest production model engines and boosts the Scorpion's ceiling substantially—at only a fraction of the cost of a new engine.



These "retrofit" kits can be installed by Air Force Maintenance Crews on a minor

repair basis *right in the field*. Already well started, the modification program will cover several hundred Scorpions assigned to the Air Defense Command at bases in the United States, and to the Alaskan and Northeast Air Commands guarding transpolar routes to America's hearland.

This is another good example of Air Force-Allison cooperation to give America the most airpower per dollar. This teamwork started in World War I and, continuing today, is an important factor in maintaining America's superiority in the air.

Allison

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